

LIMITATIONS ON APPLYING PEIRCEAN SEMEIOTIC BIOSEMIOTICS AS APPLIED OBJECTIVE ETHICS AND ESTHETICS RATHER THAN SEMEIOTIC

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ABSTRACT

This paper explores the critical conditions of such semiotic realism that is commonly presumed in the so-called Copenhagen interpretation of biosemiotics. The central task is to make basic biosemiotic concepts as clear as possible by applying C.S. Peirce's pragmaticist methodology to his own concepts, especially to those that have had a strong influence on the Copenhagen biosemiotics. It appears essential to study what kinds of observation the basic semiotic concepts are derived from. Peirce had two different derivations to the concept of sign, both having a strong logical character. Therefore, it is discussed at length what Peirce's conception of logic consists of and how logical concepts relate to the concepts of other sciences. It is shown that Peirce had two different perspectives toward sign, the 'transcendental' one and the objective one, and only the latter one is executable in biosemiotic applications. Although Peirce's theory of signs seems to appear as twofold (if not even manifold), it is concluded that the core conception has been stable. The apparent differences are presumably due to the different *perspectives* of consideration.

Severe limitations for the application of Peirce's semiotic concepts follow from this analysis and this should be taken into account in biosemiotics relying on its Copenhagen interpretation. The first one concerns the 'interpreter' of a suggested biosemiotic sign — whether it is 'we' (as a 'meta-agent') or some genuine biosemiotic 'object-agent'. Only if the latter one is determinable, some *real* biosemiotic sign-action may occur. The second one concerns the application of the concept of the object of sign — its use is limited so that *a sign has an object if and only if it seeks a true conception about it*. This conclusion has drastic further consequences.

Most of the genuinely biosemiotic sign-processes do not tend toward truth about anything but toward various *practical ends*. Therefore, the logical concept of sign, e.g. the one of Peirce's semeiotic, is an *insufficient* concept for biosemiotics. In order to establish a

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sufficient one, Peircean theoretical ethics and esthetics are introduced. It is concluded that they involve simpler and more general but still normative concept of sign — the concept of *anticipative* or *constructive representation* that does not represent any object at all. Instead, it is a completely future-oriented representation that *guides action*. *Objective ethics* provides the suitable concept of representation, but it appeals to *objective esthetics* that provides a theory of (local) *natural self-normativity*. The concepts of objective logic form the special species of objective ethics. The conclusion is that biosemiotics should be based on applied objective ethics and esthetics rather than on (Peircean semeiotic) logic and its metaphysical application.

Finally, the *physiosemiotic* over-generalization of the concept of sign is shortly discussed. It is suggested that it would be more appropriate to rename such controversial generalizations than to adhere to semiotic terminology. Here, again, Peirce appears as a healthy role model with his ‘ethics of terminology’.

1. PRAGMATICIST BIOSEMIOTICS

1.1. The Quest for Biosemiotic Realism

Biosemiotics can be loosely defined as “the science of signs in living systems” (Kull 1999: 386). It can be taken as a mere heuristic device, eliminable language-game, illustrative metaphor, or decorative topping for primary biological theory, but more often biosemioticians hope it could bring up some new substantial theory or irreducible concept to biology. If this latter aim is considered possible and desirable, the signs that biosemiotics is supposed to study should be considered as *signs for living systems themselves*. That would mean that the biosemiotic point of view should include some more or less vague notion about *semiotic realism*¹ that actual signs, meanings, etc. are effective or active —i.e. *real*— as signs independently on their being observed, interpreted, and conceptualized by us humans (cf. Emmeche 2004: 118). The expectation is that we could find some semiotic action in nature that is as real as plain physical action and irreducible to it. The purpose of this paper is to study the conditions of the possibility of such biosemiotic realism in relation to contemporary biosemiotics, and especially to its ‘Copenhagen interpretation’ that is, perhaps, its most developed and ambitious school so far.²

Most obvious candidates for presumably real natural signs are found by extending the common sense conception about human signs into the animal kingdom. This extension was put forward in the first decades of the 20th century by the grounding classic of biosemiotics, Jakob von Uexküll, and independently from the 60’s onward by Thomas Sebeok (cf. Kull

¹ If the philosophical quarrel about realism is found too confusing or disturbing, it could be replaced by talk about *semiotic materialism* (cf. Hoffmeyer 1997b) instead of realism.

² The seminal publications of ‘Copenhagen interpretation’ of biosemiotics are Hoffmeyer and Emmeche 1991, Emmeche and Hoffmeyer 1991, and Hoffmeyer 1996 (orig. 1993). Søren Brier’s *cybersemiotics* (e.g. Brier 2003) is quite close to it. The other main wings of general biosemiotics are following: 2. Tartu *ecossemiotics* by Kalevi Kull, inspired by (e.g.) Lotman’s cultural semiotics and deep ecology, “investigates human relationships to nature which have a semiotic (sign-mediated) basis” (Kull 1998, 351). 3. Prague *biohermeneutics* by Anton Markoš (2002) is applying hermeneutic (e.g. Gadamer and Ricoeur) into biology. A somewhat critical attitude toward the mainstream neo-Darwinist paradigm is common to all these three. 4. Marcello Barbieri’s (2003), say, *biosemantics* in terms of *organic meaning* and *code* is a somewhat more traditionally naturalist approach. In addition, *zoösemiotics*, *phytosemiotics*, and even *robosemiotics* could be listed as subdisciplines of biosemiotics. About the (pre)history of whole biosemiotics, see Kull 2005.

2005: 6,13-14). Animal percepts and communicative gestures seem to work as signs for the animals themselves independently on *our* interpretations about them.³ However, besides these zoösemiotic extensions, contemporary biosemiotics contains extensions that are much more radical. It argues for the reality of some intraorganismic, *endosemiotic* signs as signs, such as metabolically active enzymes, hormones, immunological antibodies, and those DNA-sequences that work as genes. That they have *biological* significance *as signs* —and not merely *as molecules*— independently on what we humans think them to be, is one of the basic hypotheses in the Copenhagen interpretation of biosemiotics. However, the peculiarity of being and functioning as a sign in such application have to be specified. What difference does it make to consider, say, a gene as a sign rather than as a sequence of a DNA-molecule?

The conception of sign commonly used in the Copenhagen interpretation has been loosely captured from Charles S. Peirce's semeiotic.⁴ A Peircean sign consists of three components: its *object*, *representamen*, and *interpretant*. Their triadic constitution is irreducible — they have no identity as an object, representamen, and interpretant independently on the whole sign they are part of. However, they may have independent identities as *things* or *events*. To put the basic idea simply, when a (*first*) thing or an event is cognized as a *representamen* of some sign, it is recognized to refer to *another* (*second*) thing or event, the *object* of that sign. Concurrently, this act of recognition means the production of a *third* thing or event in the mind of a recognizer, the *interpretant* of the sign. This interpretant refers to that same object becoming accordingly another sign of the object.⁵ It is commonly assumed among biosemioticians that real biosemiotic signs take such triadic form.

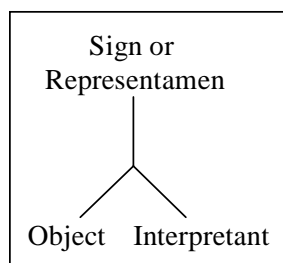


Figure 1. Basic form of Peircean sign

Not surprisingly, the vague semiotic realism suggested from the biosemiotic point of view comes close to those metaphysical doctrines that Peirce called his 'objective idealism' or '(extreme) scholastic realism'. They argue for the notion that 'ideas' (i.e. signs, laws,

³ A beautiful example can be found in Hoffmeyer (1997a) who refers to the field studies of Anthony Holley (1993): "A brown hare can run almost 50 per cent faster than a fox, but when it spots a fox approaching, it stands bolt upright and signals its presence (with ears erect and the ventral white fur clearly visible), instead of fleeing. After 10 years and 5000 hours of observation Holley concluded that this behaviour is energy saving: if a fox knows it has been seen, it will not bother to give chase, so saving the hare the effort of running."

⁴ The term "semeiotic" is used here to refer to Peirce's own specific *theory* and conception about semiotic which, in turn, is used to refer generally to the subject area of sign studies.

⁵ Thus, an interpretant is always a product of a sign as sign. It can not have an independent existence as a thing or event.

habits, universals, final causes, and even qualities) are objectively cognizable as real,⁶ not that they were all real, but that some are (cf. CP 5.430, 5.453, 6.24-25, EP 2:343). This last reservation forms a challenge also to biosemiotics: which ones of the presumed biosemiotic signs *are* real and actual independently on us, and which ones are *not* but are real and effective —as signs— *only* through our interpretation, *only* because *we* consider them as signs. These latter ones are not signs for the supposed living systems themselves. They do not *act* as signs in these systems but their significant effects are reducible to their physical effects.

Although there are plenty of good reasons to maintain that genes are some kind of real signs, it has appeared difficult to determine what kind of signs genes are, i.e. how they function and are structured as signs.⁷ This difficulty can be seen as a symptom of the importance of the above mentioned challenge and it indicates there being some principal problems either in the whole concept of sign itself or in its application to biology. I have suggested (Vehkavaara 2002) that the difficulties follow from the fact that the concept of sign (if taken as a *meaningful* sign and not merely as a signal) is a *mentalist* concept. It is originally derived from our internal self-understanding and thought to refer to things that have a mental component (in our mind). Therefore, its comprehensibility is ultimately dependent on the first person perspective. Signs are familiar to us as signs interpreted by *me* and meaningful to *me*. That also other people interpret signs meaningful to *them*, I cannot similarly ‘directly know’, but first I have to assume that these others are similar enough to me in this respect.⁸ Though this hypothesis is practically quite safe in anthroposemiotics, it becomes daring when it is extended —as in biosemiotics— to concern other forms of life than mere human beings, and it becomes even more daring when possible endosemiotic signs are considered. It is far from clear how the identities and boundaries of ‘interpreting agents’ (or their correspondents) could be determined for endosemiotic signs and to what extent these agents are similar to us. To whom do genes, hormones, antibodies, etc. appear at the same time both cognizable and meaningful? Because of the mentalist human point of view, an implicit assumption about some ‘human mind kind of’ semiotic agent is built into the structure of the concept of sign, and consequently into the whole (Peircean) biosemiotics. This somewhat ‘necessary’ anthropomorphism is one source of the difficulty in distinguishing real biosemiotic signs from imagined ones (i.e. from those ones, which are effective *as signs* only through *our* interpretations). If biosemiotics is supposed to produce more than mere emotional effects in science, or if it is going to be more than mere vague poetic metaphor, the concept of sign has to be abstracted and defined carefully — mere intuitive common sense idea does not suffice.

⁶ Peirce’s use of the term ‘real’ is contrasted to *figment* rather than to ideal. Anything that is not dependent on cognizer’s will and imagination at the moment of cognition is real: “That is *real* which has such and such characters, whether anybody thinks it to have those characters or not.” (EP 2:342, 1905.)

⁷ Some discussion can be found in Emmeche and Hoffmeyer (1991), Sharov (1998), and Vehkavaara (1998, 2002). See also Chapter 4.2.

⁸ Without that assumption, we could as well propose other people being mere zombies or skillfully programmed robots by some evil spirit.

1.2. Why to Make Our Semiotic Concepts Clear?

Peirce himself was well aware of the initial anthropomorphism of his approach and admitted that his anthropomorphic starting point is a possible source of error (EP 2:410, 1907). Still, he proudly maintained that anthropomorphic hypotheses are generally profitable for scientific explanations (EP 2:193, 1903). The anthropomorphic errors should nevertheless be avoided. One common source of such errors is the intuitive or ‘metaphorical’ basis of used semiotic concepts. In order to avoid “unclear and nonsensical hypotheses” that the anthropomorphic starting point easily produces, Peirce developed the *pragmaticist* methodology (or ‘methodeutic’) for science (cf. CP 5.212, 1903 and 5.401-402, 1878). Because of the above-mentioned ‘necessary anthropomorphism’ of biosemiotics, we must be extra careful when applying semiotic concepts to living phenomena. If they were made as ‘clear and distinct’ as possible, we might find out how and where they should, or could, justifiably be applied in biosemiotics. Let us try Peirce’s method and apply the principles of pragmatism to his own semiotic conceptions — and especially to his triadic concept of sign.

There are numbers of reasons why we cannot merely refer to Peirce as an authority what comes to the theory and concept of sign. Peirce had no single unified and well-grounded theory of signs, but numbers of partly incompatible notions and concepts composed during a period that took almost 50 years. Although they have more unity than it may seem on the surface, Peirce himself noticed that most that he states about signs is not a scientific result, but based only on “a strong impression due to a life-long study of signs” (EP 2:413, 1907). He explicitly denied having tenable grounds for his “sundry universal propositions concerning signs” (EP 2:462, 1911) and seemingly never achieved a clear and scientifically grounded conception about what semiotic would be. He was a pioneer or a backwoodsman of semiotic, as he characterized himself (EP 2:413, 1907). In spite of his efforts, semiotic was not yet a science in Peirce’s times (and hardly even in our times) — there was no scientific community of semioticians any more than established basic theory about it. It had no unambiguous niche in Peirce’s classification of sciences that was intended to be about sciences in their *present* condition. If related to existing sciences, some of his own judgements about signs should clearly be classified under psychological sciences, some under metaphysics, most of them under logic, and some under mathematics. Moreover, some of these statements are dependent on others according to the science they belong. The validity of metaphysical judgements, especially, is dependent on the corresponding logical ones (but not *vice versa*) that, in turn, are dependent on some mathematical principles (cf. Chapters 2.2 and 2.3).

Despite his self-criticality and awareness about the grounds of his notions, Peirce certainly thought having strong scientific grounds for *some* of his conceptions although he doomed many of them as mere impressions. An impression, even if based on life-long study, and even if correct, is not enough for true science. An impression is not *self-controlledly* produced which is the special characteristic of scientific inquiry. Impressions are derived directly from intuitive feelings and the estimation of their validity is beyond rational self-control.⁹ Thus, if we use Peirce’s writings as a guideline to semiotic concepts, we must first

⁹ This claim is acceptable only if considered from the momentary point of view. According to Peirce, not all of our instinctive intuitions are ‘innate’, we have also acquired habits and some of them can be the results of rational inquiry. In that sense, we may have ‘rationalized’ beliefs and feelings. However, when we adopt some result of rational inquiry as our habit of action, i.e. when we are driven to *believe* in it, it is shifted from the theoretical

consider under what science he is talking about. Secondly, we must consider what cognitive status he himself attaches to his statements, i.e. whether they are proofs, beliefs, opinions, guesses, or impressions, and whether he loaded them with possible scientific or practical value. Thirdly, whenever he gives some arguments for his conceptions, we must consider what their real validity and applicability are. In addition, we must take account that many of Peirce's writings are non-published and unfinished drafts, and as such, they do not necessarily contain the thoroughly studied conceptions but provisional stages of thoughts under development. It is our task to choose which concepts and conceptions are the most justified and grounded independently on his own non-scientific beliefs, opinions, and impressions. Therefore, it should be more than clarifying to apply Peirce's own methodological principles—especially his pragmatism (but also 'the ethics of terminology')—to his writings.

1.3. Applying Pragmatism to Semiotic Concepts

The core of Peirce's pragmatism as a methodology is its definition of the intellectual (or rational) *meaning* of concepts, the famous "pragmatic maxim":

Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object. (CP 5.402, 1878.)¹⁰

The intellectual meaning of Peirce's concept of sign lies then in its conceivable practical bearings (for 'purposive action') i.e. in its possible applications. If we look at Peirce's own examples and illustrative applications of signs, which he drew in order to make his conceptions more understandable, it is remarkable that almost exclusively they concern *human* cognition: perception, thought, and its transformation in (both internal and intersubjective) communication. Even the most famous of his rare examples about possible *non-human* representations, the turning of a sunflower towards the sun, was used to demonstrate whether there are any genuine representamens that are *not signs*. A sign was defined (in that context) as "a Representamen with a mental Interpretant" (Peirce CP 2.274, 1903). Moreover, throughout his career, Peirce considered signs of human cognition in context of or in relation to *scientific inquiry*. The steps of scientific investigation were presented as the special case or 'the highest rank' of human cognition (cf. the methods of settling opinion, for instance, in EP 1:115-123, 1877). A strong impression can not be avoided that Peirce's main motivation and purpose for the theory of signs was to develop 'logic of sciences' and that his concept of sign was primarily even *designed* for that purpose (cf. W 1:165,322-329, 1865). However, this 'design' (if there is such) and his possible other purposes or intentions do not determine the *whole* meaning of the concept (but can give us

sphere onto a practical one. Though such beliefs are produced self-controlledly, their *use* is no more self-controlled — they are, in practice, dogmatically accepted. (Cf. EP 2:32-34,40-41,337.)

¹⁰ Notice the difference from the loosely pragmatist (like Wittgensteinian) idea of meaning as use. In Peirce's pragmatism, the meaning of a concept is *not* found in its *actual* application to action or use (though it may serve as a test of the truth of a conception). Instead, a meaning is 1) a *conception* about 2) the *all* 3) *conceivable*, i.e. possible, potential, or expectable 4) *practical* effects of the object of the original conception, 'practical' referring to events that could be recognized or 'verified' independently on their becoming as the effects of the concept.

only a *hint* about it). If we want, *we* can extend Peirce's concept of sign to cover a much wider domain than he himself did.

Because the intellectual meaning is defined in terms of 'conceivable practical bearings', this definition can be characterized as an effort towards better control over the potential *interpretants* of the conception in focus. However, it is noticeable that in the definition, those 'practical bearings' are the ones of the *object* —i.e. the referent— of the conception. Thus, in order to determine the pragmatic meaning of the concept of sign, we need a control over the intended (or assumed) *objects* of the concept of sign too. The reason for the importance of getting a proper picture about the class of the referents of the concept of sign is that for Peirce, scientific concepts cannot be accepted merely as (culturally or intuitively) 'given'. Culturally 'given' everyday concepts are too vague for scientific use — scientific concepts have to be derived from certain kinds of *observation*. This hidden demand for control over the *formation* of our concepts is underlined in another formulation of the maxim of pragmatism:

The elements of every concept enter into logical thought at the gate of perception and make their exit at the gate of purposive action; and whatever cannot show its passports at both those two gates is to be arrested as unauthorized by reason. (EP 2:241, CP 5.212, 1903)

Thus, in order to avoid 'unclear and nonsensical hypotheses' in semiotics, we need also to ask what kind of 'perception' or observation the elements of Peirce's conception of sign are based on, i.e. how they were (or can be) derived. This should reveal what the intended *object* of the concept of sign is. It will turn out that especially we should ask, what the intended object of the concept of the object of sign is.¹¹

After these considerations, we have much better possibilities to control the application of semiotic concepts in biosemiotics. I am driven to suggest the much narrower interpretation of Peirce's concept of triadic sign than he, perhaps, usually suggested. But this interpretation is based on Peirce's own self-understanding about what kind of sciences he was actually practicing.

2. SIGN AND THOUGHT AS *LOGICAL* CONCEPTS

2.1. Logic and Thought in Terms of General Semiotic

Though Peirce made contributions in numbers of different scientific disciplines, it is not an exaggeration to say that logic rises above all others (cf. Fisch 1982: xviii-xxiv). Unlike in contemporary semiotics in general, the Peircean triadic sign with object and interpretant was essentially born and raised as a *logical* concept — not as a metaphysical, linguistic, social, cultural, or psychological one. Throughout his career, he constantly classified his semeiotic as his theory of normative logic. Thus, it is more than relevant to explore what Peirce's conception of logic consists of.

Traditionally, logic has been characterized as an *art of reasoning* (cf. EP 2:11, 1895) or a kind of rational way of thinking. Peirce, however, wanted to develop logic as a *science* of

¹¹ Here, we should be careful of not confusing the object of the concept of sign with the concept of the object of sign (and with the object of the concept of the object of sign).

reasoning, not an art or practice. ‘Logic’ is the *name*¹² of a philosophical science that should provide *theories* about the art of reasoning (e.g. EP 2:30, 1898). The object of logical studies, *reasoning* is a *certain kind* of thought or thinking. But thought is, in itself, quite an abstract and vague concept, which is hard to grasp because of its internal, immaterial, temporary, and flexible characters. The 20th century western philosophy, almost every branch of it,¹³ has tried to solve this problem by making a ‘linguistic turn’, by considering only linguistically expressible thoughts and language as *the* medium of thought. Peirce strove for a more general solution, to found the science of *semiotic* that would consider also other than mere linguistic signs as the possible media of thought.

Peirce had a number of reasons to think that thought and signs are intertwined. Firstly, as a starting point to the concept of sign, the peculiar character of signs was *defined* to be exactly their ability to mediate thought or meaning. Secondly, he insisted that only *embodied* thoughts can be considered and that the embodiment of thought is a sign (EP 2:256, 1903). Thirdly, from the very beginning of his philosophy, Peirce opposed all forms of foundational intuitionism. He forcefully argued that no intuition, any more sensuous than intellectual, could guarantee an unconditionally or absolutely certain foundation for knowledge. If all ‘intuition’, i.e. direct or non-mediated reference to the object of thought, is impossible, as Peirce argued, all thought have to be mediated by signs (cf. CP 5.213-215, 251-253, 1868). Thus, Peirce concluded that traditional logic, or the emerging modern logic, should be expressed in terms of general semiotic.

2.2. What *Kind* of Science Is Logic in Relation with Other Sciences?

In Peirce’s general conception of science, science was defined as a special type of (human) *action*, as ongoing investigation, as what the researching scientists *de facto* do. No established collection of truths already acquired could by itself define a science. Instead, a science became identified with an existing scientific community, the members of which have joint aims, standards, and methods for their research. (CP 1.122-124, 1902, CP 4.9, 1906, cf. Fisch 1986: 340, Kent 1987: 81-82.) In this sense, Peirce classified logic as a *theoretical*, *positive*, *philosophical*, and *normative* science — i.e. as a science that seeks *true* propositions about the *facts* of the *real world*, the propositions that are derived from and tested with the observations of *common experience* and that concern the *criteria of validity*:

As already noted, Peirce took logic as a Science of reasoning and not as an Art. Depending on their ultimate purpose, sciences were further divided into *theoretical* and *practical* and logic was defined as a theoretical one. Practical sciences develop theories

¹² Peirce mostly uses the term ‘logic’ as the *name* of the science and *not* to refer to its *object of study* which is another common use of the term ‘logic’ (e.g. in phrases ‘women’s logic’ or ‘logic of the universe’). Logic in this latter sense is, especially if considered as a *description* of a *real* phenomenon, rather a question of metaphysics or psychical sciences than of logical science (cf. Chapter 2.3).

¹³ The main exceptions are classical pragmatism (Peirce, James, and Dewey) and the phenomenology e.g. of Husserl and Merleau-Ponty (perhaps also some neo-Kantians should be mentioned). Most of the other major philosophical schools have gone through the ‘linguistic turn’: the analytic philosophy (e.g. Russell, Wittgenstein, and Carnap) and the so-called ‘neo-pragmatism’ (e.g. Quine, Rorty, and Putnam) as well as ‘German’ hermeneutics (e.g. Heidegger, Gadamer, and Habermas) and ‘French’ structuralism and semiotics including post-structuralism (e.g. Saussure, Levi-Strauss, Barthes, and Derrida). What is characteristic of this ‘linguistic turn’, or for the most of its representatives, is that social communication is incontestably assumed to be the primary function of language.

ultimately for some *practical purposes* that are *ulterior* to them (EP 2:458, 1911), such as advancement in skills, wealth, powers, human welfare, or entertainment. In theoretical sciences, instead, mere *truth about the object* of an investigation is the ultimate criterion for the successfulness of that investigation.¹⁴ Thus, no purposes ulterior to a logical investigation itself should be counted when the *validity* of logical theory is judged.

By determining logic as *positive* and *philosophical*, Peirce wanted to distinguish it from *mathematics* and *special sciences*. Mathematics, theoretical philosophy, and special sciences are the three main classes of theoretical sciences¹⁵ divided according to *the kind of observations* they employ in their search of truth (about their objects). This division is essential to keep in mind, since we are interested in the kind of observation from which Peirce derived his concept of sign.

1. Pure mathematics is based on the observation of *imagined* objects without any guarantee of their application in the actual world. It can describe only the *possible forms* that things (including thought) *may* take in our universe. It is a pure science of *hypotheses* providing no *positive* information about the *actual* reality of our universe. As such it is the *negative science*. (CP 2.782, 1901, CP 1.247, 2.77, 1902.)
2. Theoretical philosophy draws its conclusions from the observation of *universal phenomena* that “come within the range of every man's normal experience, and for the most part in every waking hour of his life” (CP 1.241, 1902). The findings of philosophy should thus be derivable from *familiar experience* common to everyone.
3. Special sciences are based on the *special experience* aided with instruments and other special arrangements and on the analysis of its minute details. Special sciences discover *new* phenomena by expanding the ordinary limits of human experience.¹⁶

Unlike mathematics, both philosophy and special sciences refer to some positive facts of our actual world being thus *positive sciences*. These divisions form a hierarchical classification of different species of theoretical sciences. The most abstract class consists of (pure) mathematics, since any fact of the actual world is always a possible one too, i.e. it manifests one possible mathematical form. Theoretical philosophy, in turn, is more abstract than special sciences, because the universal experience that philosophy observes should be present in *any* experience, also in those special experiences within which special sciences

¹⁴ Naturally, truth can be a goal in practical sciences too, but only a *useful* truth, useful in relation to some practical needs or ends.

¹⁵ From 1902 onward, Peirce recognized two subbranches of theoretical sciences: the *sciences of discovery* and of *review*. These three classes are the ones of the sciences of discovery. All considerations that relate different sciences in general, also this classification of sciences, belong to the sciences of review. Practical philosophy (e.g. ethics in conventional sense) is not a theoretical science but belongs under practical sciences.

¹⁶ The special sciences consist of two subclasses, physical and psychical. The difference between physical and psychical special sciences is that ‘physics’ sets forth the workings of efficient causation and ‘psychics’ of final causation (CP 1.242, 1902). Physical and psychical phenomena are not independent on each other since Peirce did not see final and efficient causation as alternatives, but some chain of efficient causes is always involved in any event guided by a final cause (cf. CP 1.212, 1902). To accommodate biosemiotics into this classification would be a tricky task. If it manages to study the *special* phenomena of life, it would seem to belong under *physical special sciences* (the one of biology). On the other hand, biosemiotics, being a science of *mind* in biological phenomena, should be classified as a *psychical* science. Thus, biosemiotics would be a kind of ‘psychical natural science’, but only if it really succeeds in explaining biological phenomena. The proper place of biosemiotics as a science —or whether it is a science at all— depends ultimately on its actual content, which is not yet settled.

operate. The order of classification follows the abstractness of the *objects* of study specific to each science (CP 1.180, 1903). Lower sciences (the objects of which are less abstract) rest for their *principles* upon (some of) the higher ones that, in turn, draw their *data* in part from the lower ones and furnish them with applications. (EP 2:35, 1898, EP 2:458, 1911, cf. also Kent 1987: 18.) Thus, for Peirce, logic should be completely independent on metaphysical (cf. the next chapter), psychological, sociological, and linguistic principles and studies.

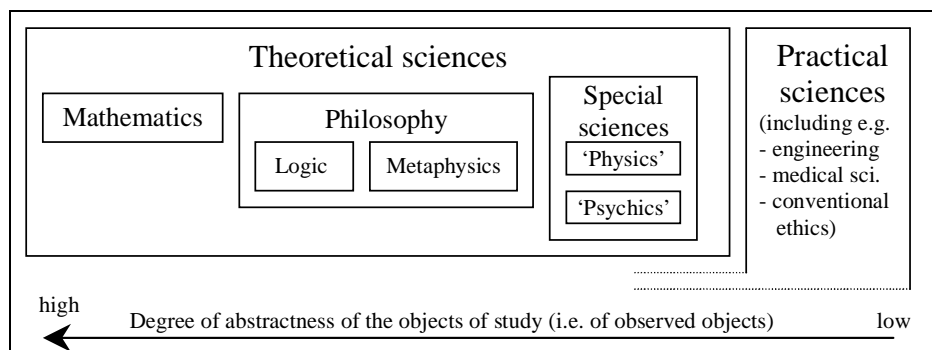


Figure 2. Overview to Peirce's 'early' conception about the relations of sciences (before c. 1902)

All the positive sciences *apply* mathematical formalisms in their own fields (cf. CP 1.133, 1894). Especially logic employs mathematical theories to such an extent that formal logic may appear as if it were a branch of mathematics. But logic is defined principally as a philosophical science and *not* as a formal one (cf. also CP 4.240, 1902):

Pure deductive logic, insofar as it is restricted to mathematical hypotheses, is, indeed, mere mathematics. But when logic tells us that we can reason about the real world in the same way with security, it tells us a positive fact about the universe. (CP 7.524, undated)

We can see that the 'positivity' of logic is emptied in its *normative* character — when it says that a reasoning is *correct* or *incorrect* (*logically valid* or *invalid*). This prescriptive character of logic is traditionally expressed by calling logic as one of the normative sciences (other two being ethics and esthetics, cf. Ch. 5.1) in contradistinction to *psychology* that is commonly taken as a *descriptive* science of the *special* phenomenon of mind and thought.¹⁷ The central task of logic as a normative science is to exhibit the criteria for the *validity* of reasoning — to establish and justify the *norms* of good thinking at the *general, formal* level. According to that normativity, any inference, interpretation, or transformation of signs should be able to judge either correct or fallacious, either good or bad. Moreover, in order to be truly normative, there should always be a real possibility for *misinterpretation*, for *incorrect*, *fallacious*, or *unsuccessful* transformation of signs. A correct interpretation can not be a necessary outcome. There are no real norms without 'freedom to choose for bad'.¹⁸

¹⁷ The logical anti-psychologism was a common trend among the pioneers of modern logic (1850-1930) despite their disagreements on the relation of logic to mathematics and metaphysics, for instance.

¹⁸ According to Peirce: "It is idle to criticize as good or bad that which cannot be controlled. (...) To criticize as logically sound or unsound an operation of thought that cannot be controlled is not less ridiculous than it would be to pronounce the growth of your hair to be morally good or bad." (CP 5.108-9, 1903.) Hoffmeyer's

2.3. The Relation of Logic, Metaphysics, and Biosemiotics

Before about the year 1902, Peirce saw theoretical philosophy consisting of only two disciplines: the normative science of *logic* and the descriptive one of *metaphysics*. The task of metaphysics is to describe the most general *facts* of the (actual) universe in so far as they can be inferred from philosophical observation, i.e. from common experience. The relation between logic and metaphysics deserves a special attention, because our quest for biosemiotic *realism* (or materialism) forces us to use the concept of sign as a *metaphysical* concept. We are looking for *real* sign-actions that are what they are independently on our opinions. Logic proper does not deal with the questions about the external applicability or realness of its concepts. Even if biosemiotics were characterized as ‘objective logic’ (as I unfortunately did in Vehkavaara 2002: 304, see Chapter 5), the ‘logic’ of any objectively cognizable real processes that are external to the observing mind would not belong to logic proper. Such study is not normative but *descriptive* of ‘natural normativity’ (at its best). It could not be more than an *application* of logical (or mathematical) concepts in metaphysics — or in special sciences.¹⁹

Peirce’s conception of logic as a principally *philosophical* science corresponds with the Kantian notion of *transcendental logic* although it is certainly *not* transcendental in the sense that it would give any foundational status to the ‘transcendental necessities’. Peirce was utterly critical toward all kinds of *a priori* ‘necessitarianism’ (cf. EP 1:298-311, 1892). Those ‘positive facts’ that logic can tell us about are nevertheless transcendental in such weaker sense that they concern the form of our internal epistemic relation with the world we live.²⁰ The source of this somewhat ‘transcendental’ character of logic is the kind of observation that philosophy is based on. Because logic should be derivable from any experience (plus mathematics), i.e. from familiar every day experience, it becomes intimately bound with ‘our’ perspective and ordinary life. At the same time, its concepts and propositions have to be abstracted so far that they are applicable almost everywhere in one way or another. The typical source of error is that the concepts of logical theory are not abstracted enough but are implicitly left unnecessarily concrete or intricate (cf. CP 2.75, 1902).

Like logic, also metaphysics appeals only to familiar experience (and mathematics), but it is far more suspicious how it could say anything at all about the *whole* reality on such experiential basis. A special problem is that according to the pragmatist definition (see Chapter 1.2), the *meaning* of propositions consists of their ‘conceivable practical bearings’

introduction of the term ‘semiotic freedom’ is particularly felicitous in this respect (cf. Hoffmeyer 1996: 61-66 and 1997a).

¹⁹ According to Beverley Kent (1987: 213-215), Peirce used the term ‘objective logic’ to refer to his own work only occasionally and not consistently. Mostly, Peirce referred by term ‘objective logic’ to the doctrine that corresponds to Hegel’s objective logic (cf. CP 2.111, 1902, or CP 6.218, 1898), which is clearly a metaphysical doctrine (in Peircean sense).

²⁰ This captures the core of the Kantian sense of the term ‘transcendental’ though Peirce would probably not have described it referring to the conditions of all *possible* experiences but rather to what is inherent in any *actual* experience. In addition, he rejected Kantian talk about “Dinge an sich selbst” (at least, if they are taken as “absolutely incognizable”, cf. CP 5.254-258, 1868). However, in his early phase, Peirce was heavily influenced by Kant’s *Kritik der reinen Vernunft* (1781/1787). His ‘new list of categories’ (EP 1:1-10, 1867) was intended to reform Kant’s categories of understanding, i.e. his *transcendental logic*, and the relation of logic to metaphysics is the same as in Kant’s critical philosophy. Nevertheless, Peirce himself used the term ‘transcendental’ to refer only to the philosophies of Kant, Hegel, etc. but never to his own one.

and these if any are hard to distinguish between alternative doctrines of metaphysics.²¹ Moreover, how can it even *derive* its concepts from ordinary experience? It is not the metaphysical reasoning, but it “is the metaphysical concepts which it is difficult to apprehend” (EP 2:31, 1898). Peirce found no other possibility that metaphysics gets its concepts by adapting the logical ones. Thus, logic appears as a more abstract science than metaphysics (CP 6.1-5, 1898). This dependence has a few corollaries that we must take into account:

1. Metaphysics is by no means the ‘first’ of sciences, but quite contrary, the *last* of the sciences of theoretical philosophy — the one whose possibility and scientificity have to be established.
2. Peirce’s metaphysical conceptions were far less secure than the ones of his logic — their scientific or epistemic status were more or less a mere ‘guess’ or the ‘Grand hypothesis’.
3. Peircean metaphysics gets the similar ‘transcendental’ character as logic. As it draws its positive content only from the universal features of ordinary experience, the most general facts that it describes must concern their *accessibility* to us, i.e. the form that they ‘necessarily’ take in our mind (independently on their more concrete content). For instance, in his paper “Evolutionary Love” (EP 1:352-371, 1893), Peirce demonstrates there being three kinds of evolution (by fortuitous variation, by mechanical necessity, and by creative love) that all are real powers of the world. They are, however, only three *possible forms* that real processes *may* take, three real possibilities that should not be excluded *a priori* when some specific real process is investigated. Whether or not an individual process (be it chemical, geological, celestial, phylogenetic, epigenetic, metabolic, psychodynamic, communicative, etc.) is dominated by ‘creative love’, for instance, is not properly a metaphysical quarrel. It is dependent on the observation of that *special* phenomenon and therefore belongs under the appropriate special science.

These corollaries have severe consequences to biosemiotics, since it is evident that in the biosemiotics of ‘Copenhagen school’, Peirce’s evolutionary metaphysics²² is found more inspiring (though not always unconditionally accepted) than his semiotic logic. Consequently, the reading of Peirce’s texts is filtered by metaphysical goggles (which is by no means merely *biosemiotic* vice), some of his logical conceptions tend to be taken as if they were metaphysical ones, and the epistemic statuses of his metaphysical conceptions are easily overemphasized. This is the first pitfall that should be cautioned.

²¹ In order to be scientific, also metaphysical statements should be fallible, i.e. experimentally testable, which is a demand quite hard to fulfill: “a metaphysician who infers anything about a life beyond grave can never find out that his inference is false until he has gone out of metaphysical business, at his present stand, at least” (EP 2:30, 1898).

²² See Brier (2003: 74-75), Emmeche (2004: 118), and Hoffmeyer (1996: 16-18, 23-27 and 1998). Among the most celebrated metaphysical doctrines (whether or not accepted) are ‘synechism’ that “being is a matter of more or less” (the principle of continuity, EP 2: 2, 1893), ‘tychism’ (or anti-necessitarianism) that pure chance is one effective cause (EP 1:313, 1892), ‘agapism’ that ‘creative love’, i.e. *co-operation* (as symbiosis, self-organization, or meta-system transition) is a real evolutionary force and irreducible to natural selection (EP 1: 360-362), such objective idealism “that matter is effete mind, inveterate habits becoming physical laws” (EP 1:293, 1891), and the general principle that “nature has tendency to take habits” (e.g. Hoffmeyer 1996: 27, cf. EP 1:296-297, 1891).

In principle, the biosemiotic tendency to treat basically logical concepts (e.g. sign) as metaphysical ones is well in accordance with Peirce's own view. However, it seems that the used concept of sign is not derived from Peirce's detailed logical description of sign-action (cf. Ch. 3.4). Instead, it is taken as a *vague* metaphysical entity characterized superficially by the vague ideas of mediation, progression or intentionality, and triadicity. Quite commonly in biosemiotic literature, it is left unspecified (or the specification is clearly unjustified) what is the object or the interpretant of the considered sign and who (or what) is the 'interpreter' that executes the sign-transformation. Thus, the excess *vagueness* of the adopted metaphysical concepts and doctrines, that makes them incapable of explaining (or even describing) anything,²³ is another pitfall that should be avoided (if biosemiotics is going to be a science).

The third pitfall is that we may be drifted to pronounce *unnecessarily strong* metaphysical statements (as in physiosemiotics, cf. Ch. 6). As such they are often either simply false or even if true, so weakly justified (if justified at all) that others do not have much reasons to become convinced of their truth. The proclamation of unnecessarily strong statements is strategically unwise if weaker claims are sufficient for making biosemiotics.

The fourth pitfall is that we are driven to *believe* our metaphysical convictions as a *doctrine*, not as the *hypotheses* or *ends* but as the *principles* or *starting points* of biosemiotic inquiry. Conceptions that are ultimately based on 'seemings', intuitions, or mere reference to Peirce's authority cannot form a *science*. Independently on the acceptance of the Peircean idea that specifically *logic* should be the source of metaphysical concepts (it is not the only possibility), it can nevertheless be demanded that their acceptance should be somehow *theoretically reasoned*. Arguments for metaphysical conceptions should ultimately appeal to truth. If the only legitimation of accepted metaphysical principles were their practical convenience, i.e. that they seem to have consequences that are politically, morally, esthetically, or religiously convenient, economically profitable, or only entertaining, the acceptance of metaphysics would be a mere ideological choice. And if biosemiotics is relying on that, it too is vitiated to mere ideology.

However, whether the pure theoretical metaphysics is possible as a science (and how it is if it is), is happily a question that a biosemiotician does not have to solve. He/she is interested mainly in the biosemiotic application of semiotic concepts and no strict demarcation between the *metaphysical* and *biological* concepts is necessary. The shift from a *logical* concept to a *metaphysical* one is nevertheless far from a trivial one. The only possibility to get a sufficiently definite *metaphysical* concept of sign that can be justifiably applied in biological phenomena is to explore the corresponding logical concept, if the Peircean concept and starting point are seen at all promising.

2.4. What Is the Object of Logical Inquiry?

The object of study in logical science is traditionally thought to be *reasoning*, i.e. *rational* thinking. As we already noticed (in Ch. 2.1), Peirce concretized the study of thought being study of signs, whatever the proper concept of sign proves to be. Nevertheless, because of the demand for *rationality*, not all thinking, streams of consciousness or chains of intuitive

²³ "It is easy to speak with precision upon a general theme. Only, one must commonly surrender all ambition to be certain. It is equally easy to be certain. One has only to be sufficiently vague." (CP 4.237, 1902.)

associations, even if mediated by signs, can be counted as the object of logic.²⁴ Thought has to be *deliberate* or *self-controlled* in order to be rational: “Logic is the theory of self-controlled, or deliberate, thought” (CP 1.191, 1903). Mere *outer* control is not enough, otherwise the thinking of a successfully brainwashed man during the brainwash would be reasoning. Mere *feeling* of reasonableness —that a brainwashed man may feel— does not make thinking reasoning.²⁵ Instead, reasoning must involve a thought that controls itself. What kind of thought can be thought to control itself? It is a thought that knows itself or at least *seeks* to know itself, its conditions to be that particular thought, a thought that seeks to know *the truth about its object*. This kind of argumentation establishes the link from rationality to self-controlling via deliberateness. Rational thought has to be at least deliberate, and in order to be thoroughly deliberate, a thought ought to contain full consciousness about itself, and therefore it needs to seek the truth about its object.

This is the original prototype of the concept of triadic sign. Logic can be specified as a truth-seeking theory of (such) signs that tend to find truth about their objects.²⁶ We get the ‘logic in narrow sense’:

[L]ogic in the narrow sense, or *Critical Logic*, is the theory of the general conditions of the reference of Symbols and other Signs to their professed Objects, that is, it is the theory of the conditions of truth. (CP 2.93, 1902)

This ‘critical logic’ or ‘logical critic’ is nevertheless only ‘logic in the narrow sense’ while the scope of semeiotic —or of general theory of signs— must be much broader. In order to find out what the objects of Peirce’s ‘logic in the broad sense’ are and how broad it is, we have to explore what kind of *observation* the concept of sign was based on and how Peirce *derived* the concept from that observation. The original observational source does not in itself limit the application of the concept — the concept is after all an *abstracted* one. They are the hidden presuppositions of the *derivation* that limit the application, and since the derivation of a concept means its *construction*, some of these presuppositions become *built into* the concept.

3. DERIVATIONS OF THE CONCEPT OF SIGN

3.1. The Original Derivation of the Concept of Sign — The Aim Toward Truth Built in the Triadic Structure of Sign

Peirce embraced the semiotic point of view already in 1865 (cf. W 1:162-336), but at the beginning, the concept of sign was treated as a more or less intuitive (or traditional) concept (cf. Bergman 2003, 3). His first actual derivation of the concept —i.e. of its triadic

²⁴ Peirce’s one early characterization of logic is following: “Logic is the study of the laws of signs so far as these denote things — those laws of signs which determine what things they denote and what they do not” (W 3:98, 1873).

²⁵ Peirce criticized heavily ‘German logicians’ and especially Christopher Sigwart for basing the logical validity ultimately on ‘logical feeling’ (*logische Gefühl*). Instead, Peirce consistently claimed that the criterion for the logical validity of thinking is a matter of *fact*, not of feeling or intuition. (CP 5.85-87, 1903.)

²⁶ Notice that truth appears here at two different levels: at the ‘meta-level’, our purpose in logic (because it is a theoretical science) is to search truth about the ‘object-level’ tendency toward truth.

structure— was made in his first published philosophical contribution, “On the New List of Categories” (EP 1:1-10, 1867). We can observe that his original method of deriving the triadic concept of sign—as a side-product of the derivation of his three *logical* categories—accords well with his conception about reasoning as *self-controlled* thought. The argumentation starts from the analysis of proposition (or ‘conception’) by directing an investigating thought into itself in order to find out *how* it can refer to its object (‘substance’/grammatical subject) and state something (‘being’/ grammatical predicate) about it (i.e. how it can ‘unite manifold sensuous impressions’). The execution of the derivation proceeds as a kind of on-line process of self-referential self-awareness about the present thought. A present thought is directed to observe itself, i.e. directed toward its origin, toward its *object*, to find truth about it, and at the same time, it is transformed into another *more self-aware* thought-sign about itself, into its *interpretant*. This way the interpretant of a proposition-sign presents itself as a mediator, or as a mediating representation that connects the representamen to its object. The procedure can be repeated by taking the interpretant as a new representamen that is connected to the object by a new interpretant-sign and so on. The interpretant is produced as a means of grasping the true knowledge about the object of thought-sign, as a means for a thought to take a full control over itself.

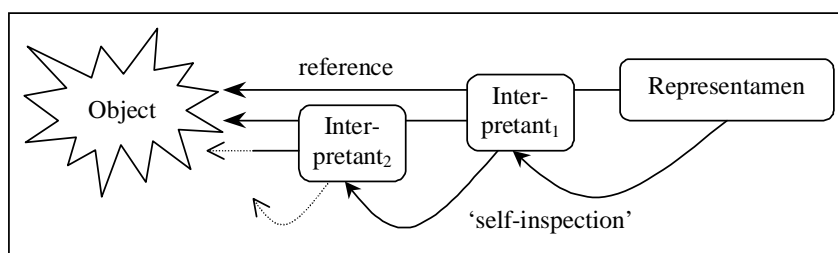


Figure 3. Peircean sign from the transcendental perspective

We can call the way of the execution of this derivation as a *transcendental perspective*.²⁷ The term ‘transcendental perspective’ is used here to refer to internalist, epistemic, atemporal, and the first-person point of view, the transcendental statements referring to ‘our’ possible means and ways of cognition, and the argumentation relying either on the ‘on-line’ self-reference or on some presumably intuitive necessity. The transcendental perspective produces a derivation *from the perspective of a sign itself*, it produces a self-referential thought process where investigating thought (‘the agent of derivation’) and a thought (or a sign) investigated (‘derived concept’) are identical or conflated.

The derivation of the concept of sign consists of the construction of the concepts of representamen, object, and interpretant and their irreducible triadic coalition as a sign. Because the interpretant is *constructed* by looking for *truth* about the object, the aim toward truth—the logical normativity—is already built in the construction of the triadic structure of

²⁷ This is somewhat misleading nomination, since Peirce’s philosophy is ‘transcendental’ only in certain restricted sense (see Chapter 2.3). Peirce derived his categories and the concept of sign in order to answer the transcendental question ‘how the synthetical judgements are at all possible’, which is a modification of corresponding Kantian question “How are synthetical judgments *a priori* possible?” According to Peirce, instead of asking for the possibility of synthetical judgments *a priori*, Kant should have asked for the possibility of synthetical judgments in general. (CP 2.690, 1877.)

sign, no matter how it will be considered or what will be considered in it. The transcendental concept of triadic sign is derived as a logical concept — it is based on *logical observation*. Especially the concepts of the object and interpretant of sign are defined exclusively as logical concepts. Consequently, the truth as the ultimate goal of sign-process is not only the matter of Critical Logic, logic in the narrow sense, but it is inbuilt to any such departments of semiotic that uses *this* concept of sign as its basic concept. Truth belongs to the substantial matters of *logic in the broad sense* that consists of the whole ‘philosophical trivium’: Speculative Grammar, Critical Logic, and Speculative Rhetoric (CP 1.444, c. 1896).

Speculative Grammar (later also ‘Stoicheiology’, CP 4.9, 1906) studies “the general conditions of signs being signs” (CP 1.444, c. 1896). One of these conditions is that signs have to be capable of being true, i.e. true representations of their objects, and that their misinterpretation is possible (otherwise, there would be no real normativity). It is Peirce’s equivalent to philosophical epistemology.²⁸ Speculative Rhetoric, which Peirce later renamed as *Methodetic*, studies “the laws of the evolution of thought,” which coincides “with the study of the necessary conditions of the transmission of meaning by signs from mind to mind, and from one state of mind to another” (CP 1.444, c. 1896). I.e. it studies the *force* of signs, how signs *would* come true, as strategies for choosing promising hypothesis.²⁹ The definition of logic or formal semiotic as a theory of self-controlled thought is its definition in broad sense (CP 1.191, 1903). Logic is in a *broad* sense a normative science, and the logical normativity, logical goodness is truth.

If all above is correct, only those signs that are able to tend toward truth about their objects can be justifiably said to be proper *objects* of Peirce’s concept of sign. If semiotic is supposed to be more extensive than what mere logic (in the broad sense) consists of, the needed broader notion of sign needs another derivation or else it remains merely at the level of vague intuitive idea. Especially, the concepts of object and interpretant can not justifiably be applied to such non-logical notion of sign without another derivation.

3.2. Objective Perspective

The original derivation of the concept of sign appeared strangely as a kind of culmination of Peirce’s early semiotic inquiries. His use of semiotic terminology practically ends (with minor exceptions) in 1867 for about 25 years.³⁰ However, during that long non-semiotic

²⁸ “It is generally admitted that there is a doctrine which properly antecedes what we have called critic. It considers, for example, in what sense and how there can be any true proposition and false proposition, and what are the general conditions to which thought or signs of any kind must conform in order to assert anything. Kant, who first raised these questions to prominence, called this doctrine *transcendentale Elementarlehre*, and made it a large part of his *Critic of the Pure Reason*. But the *Grammatica Speculativa* of Scotus is an earlier and interesting attempt. The common German word is *Erkenntnisstheorie*, sometimes translated Epistemology.” (From entry “Logic” in *Dictionary of Philosophy and Psychology*, 1901, ed. James Mark Baldwin, CP 2.206.)

²⁹ “It is further generally recognized that another doctrine follows after critic, and which belongs to, or is closely connected with, logic. Precisely what this should contain is not agreed; but it must contain the general conditions requisite for the attainment of truth. Since it may be held to contain more, one hesitates to call it heuristic. It is often called Method; but as this word is also used in the concrete, methodic or methodetic would be better.” (From entry “Logic” in *Dictionary of Philosophy and Psychology*, 1901, ed. James Mark Baldwin, CP 2.207.)

³⁰ See Bergman (2003) and Deledalle (2000: 58). The major exception is Peirce’s 1872–1873 Logic (W 3:14–108) but from 1873 to 1894, Peirce does not seem to use the word ‘representamen’ at all and the word ‘sign’ is used only in its non-technical ordinary meaning.

slumber, a new perspective was gradually adopted so that when Peirce reintroduced the semiotic inquiries in 1894, it started to develop toward a new direction.

The new perspective that Peirce adopted can be named as the *objective perspective*, because within it, a sign is no more considered merely from the perspective of its own, but the whole *chain* of signs, the whole semiosis *process* or succession of signs, is taken as an object of study. A present investigating thought in observer's head is no more considered as a part of the object of study — it is not the interpretant of the signs of the process under investigation. Instead, the mind is methodically split into the 'observed-mind' and 'observer-mind'. The agent of interpretation and the agent of consideration of that semiotic process are distinguished — the terms used here are 'object-agent' and 'meta-agent' (cf. Vehkavaara 2002: 299-300). The adoption of this new perspective does not necessarily reject the results of transcendental inquiries — the basic description of the concept of sign was still irreducibly triadic — but its main addition and benefit is a possibility to adopt a *temporal perspective* so that the difference between atemporal 'sign-objects' and temporal 'sign-actions' can be made (cf. Deledalle 2000: 38-39). The focus was no more on the 'static' transcendental question about how the representative relation was possible, i.e. how a connection (or 'unity') is brought between a representamen and its object. Instead of describing an *interpretant* as mediating ('logico-transcendentally') between a representamen and its object, the *representamen* was described as mediating ('semio-dynamically') information from the object to the interpretants. The main attention was shifted from *sign-objects* to *sign-processes*, from the past causes to future effects of a sign.³¹

For biosemiotic application, the introduction of the objective perspective is more than a welcome occasion. The objective perspective does not make possible only the retrospective (or prospective) consideration of meta-agent's own past (or future) thoughts. The objective perspective is not only a tool for self-examination, but it makes possible some kind of epistemology or logic 'of the other one'³² too, which is a precondition of any realistic biosemiotics. It is the objective perspective involved in biosemiotics that frees us to talk and think about non-human minds and non-conscious sign processes in terms of Peircean semeiotic. In one form or another, the objective perspective, even if not recognized, is inevitable in biosemiotics — an organism or any other such biofunctional unit that (presumably) has some semiotic activity is the object-agent and its semiotic activity is studied by a biosemiotician, by a *human* meta-agent.³³

The objective perspective raises a question that the point of view of the transcendental perspective can not raise similarly. Sign-processes are always somehow 'lawful', habitual, or directed phenomena — a completely accidental or random output cannot be said to be an interpretation. The habit that governs the interpretation must be embodied somewhere, it must have some existing carrier that is observed, when actual sign-processes are considered. Therefore, the question about the identity and the characters of the object-agent, i.e. the *interpreter*, the semiotic agent, or the 'system of interpretance', arises. We have to ask, *for*

³¹ Peirce's change in perspective may be affected by reading (at the latest in 1879) of the Epicurean philosopher Philodemus who frequently used the term 'semeiosis' ('sign-action') and whose main view to it was "from the side of the interpretant" while Peirce's original view was from the side of the sign itself (Fisch 1986: 329-330).

³² The term 'epistemology of the other one' (sometimes also 'phenomenology of the other one') is coined by evolutionary epistemologist D.T. Campbell. (Campbell 1966 and 1988, cf. Vehkavaara 2002.)

³³ Although I have suggested that *certain* kind of naturalization of semiotic concepts would be profitable in biosemiotic science (Vehkavaara 2002: 295-297), the mere objective perspective as such does not presume or suggest any kind of naturalization of concepts.

whom a transformation of signs is and can be normative and meaningful. What characters and structure must this semiotic agent have? Moreover, what could the internal normativity or meaningfulness be for that agent, especially if the agent is not an individual human being?³⁴

The question about the interpreter does not arise similarly in the transcendental perspective, because it makes no distinction between object-agent and meta-agent (or they are conflated). The transcendental perspective is self-referential in the sense that the investigating thought *is* the interpretant of the investigated sign. However, such ‘perspective of a sign itself’ is possible only through the (implicit) assumption about some kind of general ‘transcendental subjectivity’ or ‘ego’ and this implicit assumption makes transcendental perspective completely inapplicable in realistic biosemiotics. It is exclusively a human internalist perspective and assumes sign’s ability to self-control and conscious self-reference. This cannot be expected to be found in the most of the other animals, not to mention endosemiosis or the other much less analogous forms of life.

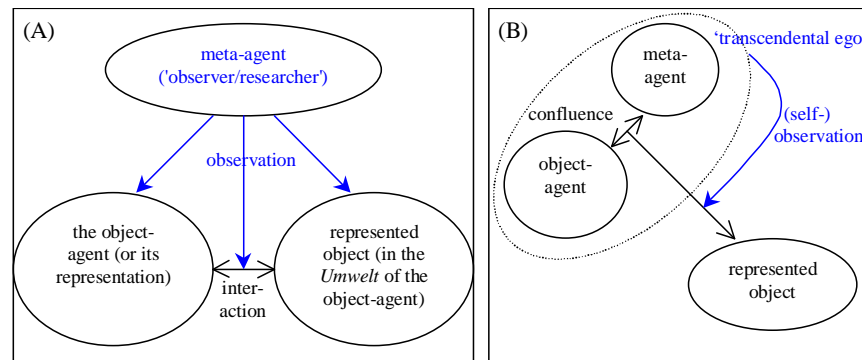


Figure 4. Observation from the objective perspective (A), and from the transcendental perspective (B)

3.3. The Second Derivation of the Concept of Sign

As we have seen, the initial prototype of sign, as a *derived* conception, did not primarily refer to the idea of an *external communicative* sign, e.g. to letters, words, sentences, or to any other linguistic or textual entities, but to the idea of a *conception* as a *thought-sign*. Even after the reintroduction of semiotic inquiries within objective perspective, the prototype for the concept of sign was still fixed on individual (human) cognition, on reasoning and learning from perception. Not until 1907, 40 years after the original derivation, Peirce finally composed another derivation of the concept of sign (EP 2:398-433, 1907, cf. also Bergman 2003: 9). Unlike the original one, this new derivation starts from the most ordinary and familiar instances of those that are commonly used to think as signs. The new prototype of a

³⁴ Because the objective perspective is based on sharp division between meta- and object-levels, it can be criticized being non-self-critical from the transcendental point of view. But this non-self-criticalness is characteristic only when a *single* study is concerned. It is always possible to generate *another* study from the objective perspective that brings the meta-level observation of the first one under a critical inquiry. The division into object- and meta-agents can be iterated.

sign was, instead of a proposition as an internal thought-sign, a common sense conception of an external *communicative* sign, an *uttered* and *interpreted* sign.

The new dialogic prototype for sign-action covers self-evidently all external signs used in intersubjective communication. However, Peirce seems to suppose that it would offer a more general starting point than the one in his original derivation of sign. He argued that it models also the thought-signs, i.e. internal signs of intrasubjective communication: “a thought is itself a sign, and should itself have an utterer (namely, the ego of a previous moment)” (EP 2:403, 1907). This emphasis on the self-experience of the ‘spitting of self’ in thought process is evidently a consequence of the adoption of the temporal objective perspective to thought-sign. The moment of the appearance of a representamen is already a past event when it is recognized as a sign (of its object), i.e. at the moment of the construction of its interpretant. The ‘ego’ that *perceives* the representamen (as it is) is slightly different than the ‘ego’ that understands it as a sign. This latter *more informed* ego may start to explore —if being capable and motivated— the conditions of that perception considering the former ego as its object-agent. As the self-reflective interpretation proceeds, this current meta-agent is reconsidered as another object-agent by a new meta-agent, and so on, as long as the chain of thought persists.³⁵

Nevertheless, the common sense conception about communicative sign was —as such conceptions always were for Peirce— only a prototype, i.e. a starting point. Peirce explicitly denied that he would investigate what is ordinarily meant by the term ‘sign’. Instead, he wanted to define the concept of sign as such “what it were best, in reason, that it should mean”, and not as such “what the definitum conventionally does mean”. Peirce intended to abstract the essential characters of signs so that it would be “applicable to everything which the most general science of *sēmeio’tic* must regard its business to study” (EP 2:401-2, 1907).

The first reservation to the conventional starting point was that at least utterers are not essential to all signs. For instance, natural signs (the symptoms of disease, the signs of weather, etc.) have no utterer. But no more interpreters seem to be necessary to signs. Written texts are signs even if they were never read or even if nobody was even capable of learning to read that language anymore, as the case is in some ancient documents of lost civilizations. (Cf. EP 2:404, 1907.) Still, all examples given by Peirce seem to assume *either* actual (or past) utterer *or* actual interpreter. From these considerations, Peirce ends up to the notion that

³⁵ It can be doubted whether the communicative prototype of sign is general enough. Even if it may be more general than Peirce’s original propositional prototype of sign, perhaps some even more general idea of asocial cognition is still required. Namely, the very idea of communication in itself —at least in the sense that Peirce used it (cf. Ch. 3.5)— presumes the idea of perception. What is not first perceived as a thing or an event cannot be further recognized and interpreted as a sign. Perception, if any, is a form of individual cognition, and according to Peirce himself, the only ultimate source of mental content, i.e. of the content of *thought* (EP 2:241, 1903). The problem is that Peirce appears somewhat ambivalent what comes to perception. On the one hand, he seems to accept such common sense notion that percepts mediate information from environment to organism, i.e. that they are in some sense signs (EP 2:328, 1904). On the other hand, the appearance of percepts is completely uncontrolled by mind, they are ‘strange intruders’ that compulsively force themselves to mind. Moreover, even the first conception of the content of a percept, a *perceptual judgement*, is compulsively produced regardless of the fact that this process is nevertheless already a kind of abstraction. Any perceptual judgement —that refers only to an individual percept— contains some general elements that are abstracted from that percept. (EP 2:227, 1903.) Because of the compulsive and uncontrolled character of (the beginning of) perceptual process, at the moment of perception, a percept does not refer to anywhere, it does not have an object, and therefore, it is not a sign. The process is not logical or even normative. Still, it brings forth signs and interpretations that are the most significant for the agent of perception. What seems to be missing is some more general analysis of perception and thought that would not be reduced to the purely logical level. Some preliminaries to this are tried to develop in Chapter 5 and e.g. in Vehkavaara 2003.

the object of sign is more characteristic of sign than the utterer itself. The object is present even in cases with an absent utterer. The interpretation of natural signs, for instance, proceeds *as if* there were some omniscient utterer who wants to give us a lesson about natural phenomena. No difference in interpretation could be made. The object of sign is that which the utterer —either actual or ‘as if’ utterer— has had (or would have had) in his/her mind. It is the essential ingredient of an utterer and its substitute when the utterer is absent. (EP 2:407, 1907).

Like the concept of object, Peirce introduced the interpretant to function as the substitute and the essential ingredient of the interpreter. When a sign has no actual interpreter, the mode of being of “its interpretant is a “would be,” i.e., what it *would* determine in the interpreter if there were one” (EP 2:409, 1907). However, the sign’s relation with its utterer and interpreter is not symmetrical. While the real utterer can be totally absent, the real interpreter cannot. Although the *actual* interpreter is not required, some *possible* or ‘would be’ interpreter is seemingly required. This ‘would be’ interpreter is not a mere empty shell, but it is implicitly presumed to have such a minimal cognitive structure that makes it *capable* of interpreting the sign in question. For instance, it has to be capable of *perceiving* those characters of the representamen that connect the representamen to its object. Especially in biosemiotics, it is evident that different ‘minds’ may have different capacities for perception and cognition — they may have different *Umwelts*— and therefore, it is relevant how the identity and significant characters of this interpreting mind are explicated. In the generalized sense of possible signs, everything can really be a sign, “all this universe is perfused with signs” (CP 5.448n1, 1906), i.e. every thing *could* become interpreted as a sign of something by *some* ‘would-be’ interpreter.³⁶ However, if this possible interpreter does not become actualized, all its interpretants will be doomed to remain in the universe of would be’s. There will be no actual semiotic effects, i.e. no sign-*action*, no actual sign *process* will proceed. As Max Fisch stresses “the fundamental distinction is not between things that are signs and things that are not, but between triadic sign-*action* and dyadic or dynamical *action*” (Fisch 1986: 330, cf. also Deledalle 2000: 44). Signs without actual interpreters can act only dynamically, i.e. they can have only physical effects. This differentiation is crucial especially in biosemiotic application — I can consider any molecule or other stimulus as a sign, but does it really *act* as a sign *biologically*, independently on the mediation of my interpretation? Does it have some genuine object-level interpreter (or ‘system of interpretance’), or does it merely have the effects of a chemical billiard ball?

3.4. The Result of the Second Derivation: Sign-Process as a Self-Controlled Habituation

The most striking difference with the earlier concept is that within the second derivation, two kinds of objects and three kinds of interpretants became recognized. The object can be considered 1) as an *immediate object*, which is the object as it is presented in the sign for the interpreter, or from the point of view of an utterer, the object in the intention of the utterer.

³⁶ This principle has had the most suggestive application in biosemiotics: one of Jesper Hoffmeyer’s basic (hypo)theses of biosemiotics concerning the habits of living systems and biosemiotic agents is that “whenever a new habit emerges it tends to become sign for somebody” (cf. Emmeche and Kull and Stjernfelt 2002: 20-21).

The object can also be considered 2) as the ultimate efficient cause of the mental effect of a sign that is as it is independently on any interpretation or intention. This *real* or *dynamic object* can ultimately be taken as the totality of *past* causes of the representamen as an *event* to be the *sign* it happens to be.³⁷ In the cases of actually uttered signs, this does not contain only the intention of the utterer, but also utterer's unconscious motives and habits or other various forces that have influenced the utterer. In principle, it contains everything that has made him or her to utter that sign. The interpretation is supposed to reveal the relevant parts of that. However, because the dynamic object is always absent in the *presentation* of a sign, it has to be somehow acquainted beforehand or by other means. Its identification is dependent on some *collateral observation*.³⁸ (EP 2:408-9,429, 1907, see later Chapter 4.1.)

The interpretant, in turn, can be considered in three different senses: the recognition of a representamen as a sign of its object creates the *emotional* or *immediate interpretant* as its immediate result. It is "familiarity with a sign and readiness in using it or interpreting it" (CP 8.185, undated) appearing as some kind of 'feeling', 'irritation', or 'excitement' in the mind of the interpreter. The interpreter or its mind should be taken here very abstractly — most generally, it can be described as that (cognitive) system which embodies the interpreting habit. The process of interpretation does not necessarily arise above such state of 'feeling' or 'readiness', in which case the feeling just fades away and the system returns to its earlier state without any significant effects. The system 'buffers' these *de facto* insignificant signs.

If the process proceeds beyond the temporary state of emotional interpretant, it evokes some real actions or efforts, i.e. either directed internal restructurations or external actions of the system. These *energetic* or *dynamic interpretants* act in themselves as signs tending to produce some general conceptions, *logical interpretants* about the object of the sign.³⁹ Interpretants form two chains of signs — the chain of dynamic interpretants representing the material, physiological, or 'existential' level of sign-process and the possible collateral chain of logical ones representing the conceptual, 'mental', or generalizing level. These chains are potentially endless but they may as well achieve a kind of end, the *final interpretant* or *final logical interpretant*.⁴⁰ This final interpretant would be a totally internalized and embodied belief (i.e. the habit of action) about the (real or dynamic) object of the perceived sign. As such, the final interpretant is no more a sign in itself (at least in *this* chain of signs under investigation). (EP 2:418, 1907.) It is the *form* that the resultant action takes, the form of its *habit* that either strengthens, modifies, or entirely replaces the earlier habit according to

³⁷ "In order that a thing may be a true sign, its proper significate mental effect [i.e. its interpretant, TV] must be conveyed from another object which the sign is concerned in indicating and which is by this conveyance the ultimate cause of the mental effect. In order to be the cause of an effect,—or *efficient cause*, as the old phrase was,—it must either be an existent thing or an actual event." (EP 2: 429, 1907.) "Dynamical object [...] is the Reality which by some means contrives to determine the Sign to its Representation." (CP 4.536, 1906.)

³⁸ Although a sign itself cannot express its object, a sign can, however, *indicate* what *kind* of collateral observation is needed for the preliminary identification of the object (EP 2:408, 1907).

³⁹ Logical interpretants are not necessary actual outcomes of every presentation of a sign: "The occasion may be too early or too late. [...] the occasion will come too late if the interpreter be already familiar with the logical interpretant, since then it will be recalled to his mind by a process which affords no hint of how it was originally produced." (EP 2:414, 1907.) It seems that an accidental or 'blind' adoption of a conception or habit is not included in the class of genuine sign-processes by Peirce. Logical, *self-controlled* adoption is required.

⁴⁰ The emphasis of the 'would be' modality of final logical interpretants suggests that Peirce assumed every genuine sign-process having a final interpretant, if not as actually achievable, then at least as some kind of limit in a distant future (EP 2:410, 1907). Moreover, Peirce considered the final interpretant as *the* proper logical interpretant so that the preceding concepts in the chain of logical interpretants are only imperfectly logical interpretants (EP 2:418, 1907).

which the interpretation was originally executed. The process of sign-interpretation is a description of a rational learning process, a process of *self-controlled habit-formation*.

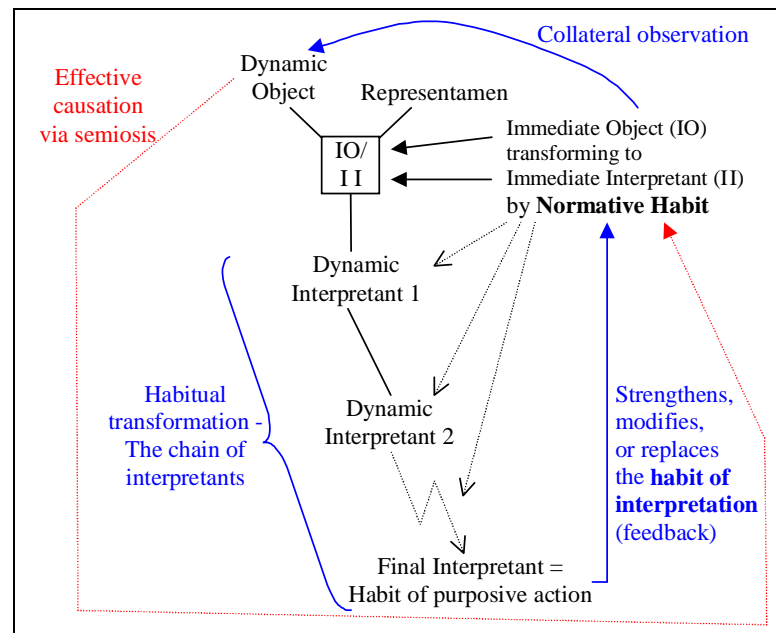


Figure 5. Sign-process as self-controlled habit-formation

3.5. The Logical Character of the Second Derivation

When comparing Peirce's early and late conceptions of sign and their derivations, at least their outlook seems very different. This persuades us naturally to doubt whether they are at all compatible and whether Peirce had only *one* theory and concept of sign. Moreover, what is the doctrine of semeiotic or semiotic that Peirce intended to clear and open up — is it something more extensive than merely a theory of logic? Did he define the concept of sign in some more general semiotic manner than merely as a logical concept?

Throughout his career (cf. W 1:304,322-323, 1865; CP 1.558, 1867; and EP 2:403, 1907), Peirce seems to have an *intention* to provide a more general theory or concept of sign than merely the logical one. Still, as we have seen, the original derivation of sign was exclusively a definition of a logical concept. And if we look carefully at what he *de facto* did in the second derivation, we will end up to a similar conclusion:

Firstly, the reasoning in the second derivation seems to proceed in such a way that the resulting concept became adapted to the results of the original derivation. Peirce ends up to the same basic terminology (object, representamen, interpretant) in both of his derivations of the concept. This should hint that the concepts, or at least, the *objects* of the concepts, are essentially the same — especially if we take seriously Peirce's 'ethics of terminology'. If there were two different concepts of sign, the ethics of terminology should have led him, instead of using the old terms, to invent new ones for those "philosophical conceptions which

vary by hair's breadth from those that suitable terms exist" (EP 2: 266, 1903). It seems probable that the main source for the differences in descriptions is the different *perspectives* through which the object of the concept of sign was observed and the concept derived. When considered from atemporal transcendental perspective, the interpretant has the mediating character. When considered from objective perspective, the representamen is seen to mediate information about the object to the forthcoming interpretant-signs. What is observed is the same but the perspective of the observation is different.

Secondly, although the starting point of the second derivation was presented as more general than the one of the original one, the idea of communication behind it is rather restricted. It is clearly governed by the ideal of transparent *rational* communication, the ideal that is most typically associated with the scientific community of investigators.⁴¹ The purpose of such interpretation is to find out the intention of an utterer and the intention of an utterer is to express oneself clearly, i.e. to get the interpreter 'truly' *understand* what the utterer has in mind. The kind of communication that aims merely to manipulate interpreter's feelings and behavior without any appeal to interpreter's rational understanding was not referred to. The blind reception of such 'sign' would not be a genuine interpretation, but its effects on the receiver would be just psychical *reactions*.⁴² Instead, the idea of an *inquiry* is involved in the starting point idea of communication just like in the original derivation, and therefore, the normative criterion of communication, or any sign process here considered, is again *truth*. The interpreter *seeks* to understand rationally what utterer's conditions of uttering are, independently on utterer's own consciousness about them. Probably because of this implicitly but clearly involved idea of rational or *scientific* inquiry, the result of the abstraction process in the second derivation matches as well as it does with the result of the original derivation. Again, despite the presumably more general starting point intention, the conception of sign seems to narrow as the derivation proceeds so that the final result fits entirely under the class of logical signs, whose normative criterion in interpretation is the truth about their objects.

As a summary, we can conclude that the initial prototype for the concept of triadic sign in *both* of its derivations appears after all to be *cognition* with the *desired* increase in knowledge. The result of both of these derivations is a logical concept of sign — a sign that is a representation *about* something that *rational* or *scientific inquiry* is supposed to reveal. The concept of sign was built as an *explanation* for the possibility of knowledge and its most natural area of application in Peirce's mind was *science* or scientific investigation in general, and as an essential component of it, *human experience*. This conclusion restricts the possibilities to apply Peirce's semiotic concepts in biosemiotics severely, as we will see.

⁴¹ Its another typical associate is the ideal type of bourgeois democratic society or publicity, the application that especially Jürgen Habermas has made well known from the late 60's onward.

⁴² One of the most dominating features of Peirce's late semiotics, is to emphasize distinction between sign-action and dynamical action (cf. Fisch 1986: 330). If this general distinction is not made, a Hegelian error will follow, the reality of 'secondness', compulsive forces, or reactions will be ignored, and one will fall on the doctrine of absolute idealism that 'to be is to be represented' (Peirce 1902, Memoir 33), i.e. that everything is representation. This conclusion follows easily if one gives a foundational or primary status to transcendental perspective — even Peirce himself was somewhat attracted to such conclusion in his early writings (cf. W 1:324, 1865).

4. CONSEQUENCES TO THE APPLICABILITY OF THE CONCEPT OF THE OBJECT OF SIGN

4.1. Restrictions on the Biosemiotic Application of the Object of Sign

Although the idea of triadic sign was originally thought to cover wider area than just the objects of logical science, especially its three components were derived—in the both derivations—as logical concepts. A question arises, whether this composition can be extended to cover a wider semiotic sphere. I have criticized elsewhere (Vehkavaara 2002: 304-308 and 2003: 558-561) the loose uses of the concept of the object of sign in biosemiotics, and concluded that the concept of object does not belong among the *basic biosemiotic* concepts. Its realization requires an interpreter with fairly complex cognitive structure that is unlikely to be found at least in the most primitive (bio)semiotic agents. The concepts of representation, interpretation, and normativity, for instance, are definable more generally, without the concept of object and these more basic semiotic concepts are needed in the definition and derivation of the concept of object. (Cf. Vehkavaara 2003.) My hypothesis will thus be that while the concepts of representamen and interpretant of the Peircean triadic sign are extendable and generalizable beyond the logical sphere, the concept of object of sign is not—it is an exclusively logical concept in the Peircean sense.

If the concept of the object of sign is taken under closer scrutiny, its role in the triadic composition of sign has to be considered. Perhaps the most fundamental character that Peirce attached to the triadicity of sign is its *irreducibility*, that the triadic form of the sign is not reducible to any (linear) series of pairs (CP 2.274, 1902) and that all three components are essential for the identity and action of sign. This has been one stumbling stone in biosemiotic applications of Peircean concept of sign. For instance, Alexei Sharov (1998: 407) has suggested that a “lineage ‘sees’ the environment through selective reproduction of its organisms” so that “differential reproduction is a sign vehicle, environment is the object and the change in gene frequencies is the interpretant”.⁴³ The first objection concerns the vagueness of the interpreter: it is far from clear in which sense the lineage can ‘see’ anything, or act as an interpreter at all. Secondly, we can question whether the differential reproduction and change in gene frequency are different phenomena at all, and even if they were different, whether the change in gene frequency is the *direct dynamic consequence* of differential reproduction. What difference in this presumed interpretation would it make if the cause of differential reproduction—the proposed object of the proposed sign—were pure chance instead of environmental change? The answer is “nothing”. The presumed interpretant is not produced in the context of the recognition of the representative relation between the presumed representamen and its object. There is, of course, always a *causal relation* between the environment and the differential reproduction in a population, but it is a representative or significant sign-relation *only for us*—they are *we*, not the lineage, that can ‘see’ differential reproduction *as representing* the environmental conditions of the lineage. The determination

⁴³ This suggestion was intended to be an upgrade for Jesper Hoffmeyer’s (1996: 16-24) initial biosemiotic application of the concept of triadic sign and Peircean terminology to ‘vertical biosemiosis’, i.e. to onto- and phylogenesis (cf. also Emmeche and Hoffmeyer 1991 and Hoffmeyer and Emmeche 1991).

of the object of sign should not be the choice of the meta-agent (i.e. ours) but the one of the object-agent.

The irreducibility of sign's triadic form requires that the object of sign is accessible to the interpreter also by other means as the sign itself — sign can never provide the sole cognitive access to object:

The word Sign will be used to denote an Object perceptible, or only imaginable, [...]

The Sign can only represent the Object and tell about it. It cannot furnish acquaintance with or recognition of that Object; for that is what is meant in this volume by the Object of a Sign; namely, that with which it presupposes an acquaintance in order to convey some further information concerning it. (CP 2.230-231, 1910.)

I.e. the object of sign has to be somehow acquainted (perceived or imagined) beforehand, before it can be represented by any sign. Peirce talks about the need for 'collateral observation':

The person who interprets that sentence (or any other Sign whatsoever) must be determined by the Object of it through collateral observation quite independently of the action of the Sign. Otherwise he will not be determined to [the] thought of that object. [...]

I do not mean by "collateral observation" acquaintance with the system of signs. What is so gathered is *not* COLLATERAL. It is on the contrary the prerequisite for getting any idea signified by the sign. But by collateral observation, I mean previous acquaintance with what the sign denotes. (CP 8.178-9, EP 2:493-4, from a letter to William James, 1909).

For a thing or event to *act* as a sign, some kind of 'presignificational' acquaintance with its object is required so that an interpretant can be produced within a comparison between the representamen and that vague 'preconception' about its object. This demand for independent accessibility to object is not merely the feature of Peirce's late conception of sign and sign-action, but it is involved in his early 'transcendental' treatment of the issue too. In 1873, Peirce wrote:

A sign [...] must be affected in some way by the object which it signified or at least something about it must vary as a consequence of a real causation with some variation of its object. [...]

The third condition of the existence of a sign is that it shall address itself to the mind. It is not enough that it should be in relation to its object [...] but must be regarded by mind as having that relation. (Peirce, W 3:82-83, "Of Logic as a Study of Signs" 1873.)

Thus, it was required that the object of sign is in *real relation* with the sign, and more importantly, that *this relation is cognized by mind*, i.e. by some interpreter. It is not enough that the interpreter (1) comes into contact with the representamen, but the interpreter must additionally be independently acquainted (2) with the object *and* (3) with the real relation that provides the connection between the object and the representamen.

4.2. Restrictions on the Applicability of the Basic Sign-Types

The foregoing considerations lead to restrictive consequences on the application of Peirce's most famous division of signs into *icons*, *indices*, and *symbols*. These restrictions do not concern so much the symbolic signs, because the representative relation of a symbol is *defined* to exist merely in the mind of the interpreter.⁴⁴ But iconic and indexical *signs* come more easily confused with mere iconic and indexical *relations*. A plain objective similarity (i.e. a joint real quality, form, etc.) between two 'things' is not enough to make the one a potential iconic sign of the other, but this similarity must also be perceptible by the intended 'interpreting mind'. If this would-be interpreter and its assumed perceptual abilities are not taken account, then the whole idea of iconicity will be idle. Any two things are similar in some respect and are thus capable of functioning as the signs of each other. Peirce did not fail to notice that "everything is both similar and dissimilar to everything else" (CP 1.567, c.1899). The role of the interpreter and its perceptual capacities are essential, though not always explicitly expressed, in the action of iconic signs. What functions as an iconic sign for us does not necessarily do so for dogs, and *vice versa*.

Perhaps even more importantly (for biosemiotics), a similar consideration applies to indexical signs. The indexical signs are those whose significant character is some real relation between the representamen and its object, the paradigmatic examples being a smoke as a sign of a fire, a weathercock, and such ostensive gestures as a pointing index finger. The demanded 'real relation' is usually a causal one — or at least some causal connection is involved in it. A mere causal connection between two things is not a sufficient condition to make the one a potential indexical sign of the other, but the causal relation has to be somehow *beforehand cognizable* by the interpreting mind. A smoke cannot represent a fire indexically if the interpreter (even if only a would-be interpreter) has no kind of general conception⁴⁵ about the causal connection between smoke and fire. A weathercock cannot be interpreted as indicating the direction of wind without some general notion (even if a false one) about the causal power of wind over the turns of the weathercock. Likewise, a pointing index finger cannot direct the attention of an interpreter to the pointed object without the interpreter's implicit habitual assumption that generally, the location of the pointed object —together with the intention of the pointing person— approximately determines the angle of the pointing finger.

In biosemiotics, however, *our knowledge* about the causes of some organic form is easily mixed with the required 'knowledge' of the intended biosemiotic object-agent. The consequence is that this organic form is thought to form an indexical representation of these causes without any consideration about the identity of the proper biosemiotic agent or its capability to have such knowledge. This seems to be the case in Sharov's basically plausible idea that a chromosomal DNA is a sign that represents the ancestor(s) of the zygote that interprets that DNA-sign producing the descendant-organism as its interpretant (Sharov 1998:

⁴⁴ The significant character of the representamen of a symbol is that the interpreter just happens to have such a habit to interpret the representamen to represent its object. There is nothing in the representamen itself that makes it represent its object symbolically. The being and existence of the representamen and the object are mutually independent, or if there are some dependencies, they have nothing to do with the representative relation. There is 'a real causation' between the representamen of a symbolic sign and its object, but it is completely mediated by the habit of interpretation of the interpreter. (Cf. EP 2:274, 1903.)

⁴⁵ Such 'conception' is usually assumed to be based on previous experience, either in individual sense (learning or 'conditioning') or in evolutionary sense (inherited 'instinct').

407). The problem is that DNA may be the sole contact of the zygote with its (remote) ancestors, and the zygote can not therefore have any kind of knowledge about the causal relation between its ancestors and its DNA. Besides, DNA does not code only the structure of its ancestors, but as well, it can be said to code some environmental conditions of its ancestors. Moreover, there is a lot of effectual information in DNA that cannot be said to code anything but are caused by genetic drift or other non-functional forces of evolution. The zygote makes no difference about the causal origin of DNA — all that matters is the existing structure of DNA, not its genealogy. It has no independent access to it. I am not suggesting that genes or DNA-strings would not act as signs for cells or organisms, but when they do, they act as signs that have no objects at all (in Peircean sense). The concept of Peircean triadic sign seems to assume too much about the ‘cognitive structure’ of interpreter in order to be applied to DNA.⁴⁶ The cells can be said to interpret the DNA-signs they contain, but they have no control on how well the interpretants represent the (humanly determined) objects, be these ‘objects’ their ancestors or their past environmental conditions. If there is some control in this interpretation (as there most plausibly is), it does not relate to past causes but to its *actual* functionality.

4.3. The Role of the Object of Sign

If I am right what comes to the applicability to the concept of object of sign, we have to ask why Peirce regarded the object of sign necessary, as it seems. One possible answer might be that after all, Peirce did not seriously endeavor to develop semiotic in the widest possible sense, but restricted his semeiotic merely as the investigation of *signs in general*. The logicians were invited as probably the best group to investigate that general semeiotic, which would be limited in such a way that the object of sign is necessary. (EP 2:461, 1911, cf. also Fisch 1986: 339-340 and Deledalle 2000: 61).

Semiotic in its widest sense should include e.g. psychological studies of signs. Peirce did not ignore such studies completely, but it is not entirely clear whether he would include them in semeiotic or only thought them resting on some results of it. At any rate, there should be no necessary reason why a *psychological* concept of sign should take the similar triadic form as the logical one. In biosemiotics, no such reason is necessary either. Psychology or psychical sciences in general are dependent on logical principles similarly as *all* special sciences are. Psychology cannot derive its concepts directly from logic since they are based on different kinds of observation. In relation to psychical sciences, logic tackles with meta-level issues, how their concepts are derived, how strong and what kind of evidence we have for such and such theory, etc. If Peirce had ever thought that the structure of his logical concept of sign necessarily provides the basic structure of the psychological concept of sign, it would have been an anthropomorphic error — a ‘ratiomorphic’ or ‘logomorphic’ error. Thus, another possible answer to the question about why the object of sign appears necessary is that perhaps

⁴⁶ The application is problematic also in many other paradigmatic biosemiotic exemplars as in the chemotactic movement of *E. coli* bacteria (cf. Vehkavaara 2003: 574-577). What comes to the case of DNA, my first attempt for revision (in Vehkavaara 1998) has appeared unsatisfactory. Paradoxically, if we omit the influence of the confused terminology, the original intuition of Hoffmeyer and Emmeche (1991) seems to me more defensible than its corrections that were supposed to be more just applications of the Peircean triadic sign (cf. Vehkavaara 2002: 308).

Peirce did fall on such anthropomorphic trap. Throughout his career, Peirce's main interest concerned scientific inquiry and its methodetic, and though he did have other more substantial goals too, he possibly could not always detach himself from that logical (or methodetic) context.

If the concept of object is not a necessary concept but a derived one and applicable only to cases of a certain kind, what then is its role or function in Peircean theory? I feel forced to suggest that the object of sign is necessary if *merely* truth-seeking signs are considered. A sign cannot be true without being true *about* something. I suggest the hypothesis that the *only* role that the object of sign has is to function as *the* internal measure of the success of interpretation. And perhaps this is not so far from Peirce's conception either:

Truth is the conformity of a representamen to its object, *its* object, ITS object, mind you. [...] There must be an action of the object upon the sign to render the latter true. Without that, the object is not the representamen's object. [...]

So, then, a sign, in order to fulfill its office, to actualize its potency, must be compelled by its object. This is evidently the reason of the dichotomy of the true and the false. [...] (CP 5.554, 1906)

The backside of the hypothesis is that if a sign-action does *not* seek truth, if the interpretation has some other normative criterion of success (like practical applicability, effectiveness, novelty, 'beauty', entertainment value, etc.), there is no need for the object — the proposed objects of sign are irrelevant or 'reducible'. If considered at the psychological level, many apparent sign-processes are not even able to tend toward truth and because biosemiotics is a kind of 'psychical natural science', similar observation should apply to many (or most) biosemiotic sign-processes too.

5. THOUGHT IN ETHICS AND ESTHETICS

One of the main problems with the biosemiotic application of Peircean semeiotic is that quite often it is not possible to make a difference between *thought* itself and intentional —i.e. thought-guided— *action*. In anthroposemiotics, the difference between thought and action is clearer — thought is *one kind* of action.⁴⁷ If I am right, the Peircean concept of sign is designed for this specific kind of action. Remember that Peirce defined his logic, his general semiotic, as the science of self-controlled thought, i.e. of thought guided thought, of *truth-seeking thought*. Biosemiotics concerning only truth-seeking thought would be a too narrow approach.⁴⁸ Living systems do not generally search for 'true conception', they may not even

⁴⁷ The difference between anthroposemiotics and biosemiotics is that animal thought can be approached only through inference from the observation of their actions, but human thought is accessible, besides through external behavioral observation, also through subjective and internal observation of our own thought. Moreover, the anthroposemiotic generalizations drawn from our internal experience are controllable in linguistic communication, but if we make biosemiotic extensions of such generalizations beyond human sphere, the similar possibility for control via comparison is lost. We have no media to compare our internal experience with the one of an ostrich, for instance. We have both internal and external knowledge about what it is to be a human animal, but ultimately (or mostly) only external knowledge about other living systems (including our own biological subsystems), what it is to be a *paramecium*, an ostrich, a bat, or a human liver.

⁴⁸ However, truth-seeking thought is not completely absent in biosemiotics. It may well be applicable at least to such *animal learning* that forms and updates some kinds of cognitive models (based on perceptions and

be capable of that, instead, they are striving for *practical ends*, for *appropriate* ‘conception’. Their interest is to bring up such behavioral habits that are successful in relation to these ends, but it is mostly indifferent whether these habits are self-controlled. Peirce too admitted that not all habits are formed in self-controlled sign-process (EP 2:431, 1907), which must mean that they are not the objects of logical theory. Therefore, I have to withdraw my earlier determination of the scope of biosemiotics as Peircean *objective logic* understood as a *theory of mind operative in nature* (cf. Vehkavaara 2002: 302). Even its modification into ‘the objective logic applied in the special phenomena of life’ would be misleading or too restrictive a characterization. However, it would be too early to conclude that Peirce’s philosophy could not provide the needed semiotic concepts for biosemiotics.

5.1. Phenomenology, Esthetics, and Ethics as New Sciences of Theoretical Philosophy

Until the first years of 20th century, Peirce thought that theoretical philosophy included only two subdisciplines, logic and metaphysics. The basic structure of the concept of sign as a logical concept was fixed under the conception that logic provided the most abstract positive science. However, in 1901-1903, Peirce’s conceptions about the philosophical sciences and his own main work changed. He found out that theoretical philosophy —that he was practicing himself— actually contains a couple of other sciences that he previously had not recognized it containing. According to this new conception, theoretical philosophy divides into three subdisciplines, to *phenomenology* (later also *phaneroscopy*), *normative sciences*, and *metaphysics*. Normative sciences divide further into three: to *esthetics*, *ethics* (renamed later as *practics*), and *logic* (or *formal semeiotic*). This addition of new sciences did not changed the hierarchical character of the classification of sciences — higher sciences should still be completely self-sufficient in relation to lower ones. Most importantly, logic with its *logical* concept of sign appeared no more as the most abstract of the positive sciences. Metaphysics was no more dependent merely on logic and mathematics, but it could now appeal to these new sciences too.

Phenomenology was abstracted as the most general of all positive sciences. The categories (firstness, secondness, thirdness) that were earlier derived as logical ones (as categories of thought) and applied in metaphysics (as categories of being, cf. CP 1.300, 1894) became now understood as primarily phenomenological ones. Logical, metaphysical, and other corresponding categories are only applications of these phenomenological ones. Any psychological, metaphysical, or logical refutation of anyone of these categories is only a refutation of that application, not of the phenomenological category in itself.

Phenomenology (or phaneroscopy) is a pre-normative science that merely describes the *phaneron* (or ‘universal phenomenon’). By phaneron, Peirce meant “the collective total of all that is in any way or in any sense present to the mind, quite regardless of whether it corresponds to any real thing or not” (CP 1.284, 1905). It is a description of the most general elements (i.e. universal categories) that are included in any content of any mind. However, ‘mind’ here (as usually in Peirce’s philosophy) does not refer merely to “an instantaneous

instincts). The most secure application of Peircean semiotic concepts in biosemiotics appears to be, not surprisingly, in the zoösemiotics of primates and other ‘higher’ mammals.

state of consciousness” but also to the unconscious or implicit content of mind (EP 2:362, 1905). Consciousness is usually capable of concentrating only on one basic element of mind at a time: either 1. to its actual content, i.e. *qualities* of feeling (*firstness*)⁴⁹, 2. to the existential event of change in that content, i.e. a sudden *compulsive appearing* of a *new* quality that replaces the *old* one (*secondness*), or 3. to its *mediative* character, its bringing something not present to mind, i.e. its reference to the future or past, which means some kind of experience of generality or continuity in time (*thirdness*). Phenomenology is in itself a study of phanera in their firstness, i.e. of what is common to all of them as they are. It is the study of categories, their degenerate forms, and their mutual relations. Normative sciences consider the general effects of phanera, their relation to ends (i.e. how they act upon us and how our action impacts upon them), treating thus phanera in their secondness. Metaphysics studies what is *real* in phanera, what they *tell* us about the reality in general — i.e. it studies phanera in their thirdness. (EP 2:197, 1903.) These new sciences appear in the similar sense ‘transcendental’ as logic did in our earlier consideration (cf. Ch. 2.3).

The idea of three normative sciences: esthetics, ethics, and logic, is a classical one, but Peirce adopted it in a modified sense. He took all of them as *theoretical* sciences, not as Arts or as disciplines that aim at practical purposes (as justice). Earlier Peirce did not consider ethics and esthetics as the sciences of theoretical philosophy but —if sciences at all— either as practical ones (belonging to practical philosophy) or as psychical ones. But now they were abstracted from their conventional practical nature so that especially ethics should not be confused with the corresponding practical science.⁵⁰ While logic was defined as a science of self-controlled *thought*, ethics was determined as the *general science of self-controlled conduct*. Because thinking is a species of conduct, logic appears as a kind of ethics of thought — ethics is thus a more abstract normative science than logic (e.g. EP 2:272, 1903). All the principles that will be found in ethics are the principles of logic as well, but not *vice versa*. The findings of logic do not bind ethical conceptions.

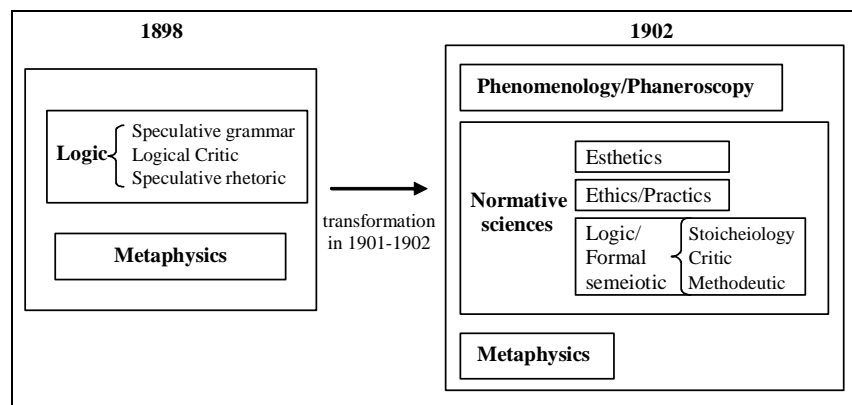


Figure 6. The transformation of Peirce's conception concerning theoretical philosophy

⁴⁹ However, the actuality is not the essential character of firstness or qualities of feeling. Instead, they are pure possibles or “may-be’s” independently on their being actually appearing.

⁵⁰ In order to avoid this misunderstanding and probably in order to obey also his “ethics of terminology” better, Peirce renamed later his theoretical ethics as *practics* “which is put in place of ethics, the usual second member of the trio” (EP 2:377, 1906).

5.2. Thought in ‘Objective Ethics’

Now, we are approaching the crucial point that Peirce himself did not probably recognize. The theoretical ethics—which does not include the traditional, practical ethics—was about self-controlled conduct, i.e. about *thought guided action*. The concept of controlling thought that is used here does not have to be the same as in logic, moreover, it should be *independent* on the logical concept of thought as a triadic sign. There is no need to give up the general argument that all thought is in signs, only the concept of sign does not have to be a logical one. While the logical concept of thought-sign was derived as a *self-controlled* thought, the controlling thought of *action* can be, but *is not necessarily*, in itself controlled. If the concept of thought that Peircean ethics involves is not necessarily the one of self-controlled thought, the correspondent concept of *thought-sign* must be a more general than the logical one (which is a species of it). Instead of looking for (internal) self-knowledge, this ‘ethical’ concept of sign concentrates completely on its (external) *future effects*, on the results of action that it guides. It does not seek any true representation but *successful action*—and the successfulness or unsuccessfulness of this controlled action determines its validity. The idea on which the ethical concept of sign is to be established should not be the one of explanative representation as in logic, but of totally future-oriented *anticipative* or *constructive representation*, which does *not* need an object to refer to.

Naturally, the guiding thought of action can be taken under investigation in order to uncover its ‘object’ that has determined its becoming into existence. *We* can seek an *explanation* for its power to control the conduct (for practical or theoretical purposes). However, biosemiotic object-agents are only very rarely capable of seeking explanations of any kind and even if they were capable of that, how much they would do that is another matter—consider how little even humans seek explanations for their success in their action. When its role in the ‘ethical’ action is considered, this kind of ‘object in the past’ is totally irrelevant, instead, only the *force* of the guiding thought over its interpretants in action is relevant. ‘True knowledge’ may be a useful guide, but nevertheless not *necessary* to guarantee the success of action—also false models can function as successful guides of action. From the point of the view of the object-agent, only the success of action matters ultimately, not the reasons why it was or was not successful.

Another possibility to save the role of the object in anticipative representation—the possibility that Peirce himself occasionally seems to propose (e.g. EP 2:493-494, 1909)—would be to say that the object of this kind of anticipating thought is *in future*. But then we would crash into another difficulty: the execution of action has to be an (energetic) interpretant of the guiding thought, but in a case of *successful* action, the result of action is also its object. If the object is supposed to be in future, there is no necessary difference between the object and the final interpretant of a sign.⁵¹

Thus, my thesis is that generally the ‘ethical’ concept of representation or thought-sign—the one of *anticipative* or *constructive* representation—lacks the concept of object and is therefore more suitable for the *basic* concept of biosemiotics than Peirce’s logical concept of triadic sign. It is a more primitive and simple concept than the Peircean one, which is a

⁵¹ Moreover, this would mean the acceptance of the idea of backward causation, that future facts could influence actual events by effective causation. It is quite unlikely that Peirce would accept such doctrine because that would ruin his analysis of the dependencies between effective and final causation (cf. CP 1.211-213, 1902).

special kind of it (cf. Vehkavaara 2003: 572-583). Because we need a metaphysical application of it, an objective and real concept, it has to be considered from the objective perspective and we get the 'objective ethics' of a kind. The use of the logical concept, composed of triadic unity of its representamen, object, and interpretant, should be restricted to model only explanative representation or truth-seeking representation since it is intrinsically designed to do that. It does not model properly anticipative or constructive representation, the primary function of which is to control action that is (positively or negatively) intentional, purposive, goal-directed, etc.

Anticipative representation can generally be described as controlling the transition from the current 'disturbed' or 'unsatisfying' initial state of the system into the 'hopefully satisfying' future state. To put it simply, at the beginning, a system finds itself in an unbalanced or disturbed state. As a result of that 'internal experience', it creates or calls for an anticipative representation that is supposed to lead it out of that unsatisfactory state. This representation redirects its actions so that the system reaches a new state. If that state is satisfying, the representation was appropriate, if it is still disturbed, the procedure is either continued or repeated with possibly some other guiding representation. The transition is self-normative because the action can be unsuccessful and the 'satisfaction' is not a necessary outcome of it.

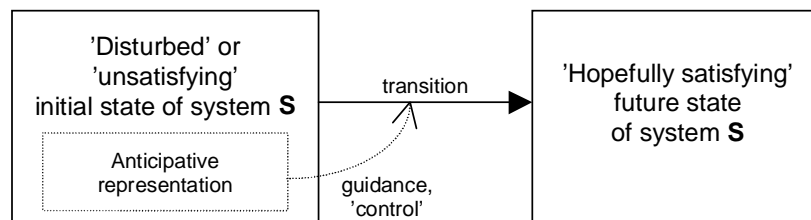


Figure 7. A model of anticipative representation with a reference to an aspired future state of the system

This model of the anticipative or constructive representation does not have the form of the Peircean triadic sign. The normative criterion for the success of the transition is determined solely by the outcome — the initial state has no role altogether when the success is judged, but the success is merely the property of the result state. No comparison between the representation and the initial state is made. Therefore, the initial state *does not function* as the *object* of representation — the anticipating or constructive representation does not *represent* or *refer* to its initial state, and it is *not* in the *same* relation with the initial state as the result state is. If it refers somewhere, it refers to the 'aspired' future state of the system (to its 'interpretant') that it endeavors to construct.

In conclusion, I would determine the scope of biosemiotics as *applied objective ethics* rather than logic, the objective ethics that would need a more general concept of representation or sign than the one of Peirce's semeiotic.

5.3. Source of Normativity — ‘Objective Esthetics’

However, mere ‘applied objective ethics’ is not enough. It provides only a theory about how normative action is executed and acquired, not the nature of normativity itself, nor its origin or emergence. In these matters, we have to turn our sight into Peirce’s first normative science, *esthetics* although he apparently did not get any detailed description of its nature, tasks, and content settled until, perhaps, his very last years. It was rather a battlefield of several contradictory ideas. (Cf. Kent 1986: 149-163.) However, for our purpose, the limited and unsettled content of Peirce’s esthetics does not matter much, since we are not interested in his esthetics as such, but we are rather looking for something that is vaguely *analogous to it*. Peirce’s esthetics, as much as one can make sense of it, seems to be a ‘transcendental’ science (compare CP 1.591-615, 1903), again. Biosemiotics, however, presumes the adoption of the objective perspective needing thus an *objective esthetics* of a kind.

Esthetics was for Peirce, like ethics and logic, a theoretical, positive, philosophical, and normative science and it was classified as the most abstract of normative sciences. Logic was a subspecies of ethics and ethics has to appeal to esthetics for aid in determining its *summum bonum*, the highest ideal peculiar to it (i.e. the ethical goodness). The argument goes on as follows: “an ultimate end of action *deliberately* adopted [...] must be a state of things that *reasonably recommends itself in itself* aside of any ulterior consideration. It must be an *admirable ideal*, having the only kind of goodness that such an ideal *can* have, namely, esthetic goodness [...] morally good appears as a particular species of esthetically good.” (EP 2:201, 1903.) Esthetics became thus characterized as a science

1. of self-controlled formation of ideals and
2. of that which is objectively admirable per se, without any ulterior reason, independently of its effects (cf. CP 1.191, 1903 and EP 2:378, 1906).

Something analogous to this, an objective theory about natural (self-)normativity, seems to be necessary for distinguished biosemiotics. The idea of natural normativity does not necessarily contain any conception about some overwhelming cosmic tendency or global teleology, but the idea is rather to establish a theory about *local system specific internal* normativity. *All* natural systems of life do not need to be self-normative although *some* (or many) of them seem to have some kind of self-normativity. That is enough for a theory, which aims to specify and conceptualize the nature of such normativity. In its biosemiotic application, following research-areas might fall under such ‘objective esthetics’:

1. *Formation of subgoals for some higher goal.*⁵² Most of the purposive or self-functional action of animals is not valuable per se, but only in relation to some ‘higher’ goal. The homeothermism, the norm of keeping certain stable internal temperature, for instance, has only instrumental value for homeothermic animals. These animals might (in principle) give up their norm of homeothermism as far as they could fulfill the higher goals, e.g. the goal of survival. ‘Choosing’ to be a

⁵² It might be more proper to classify a part of this, if not wholly, under objective ethics rather than under objective esthetics. At least Peirce’s characterization of his theoretical ethics as “the study of what ends of action we are deliberately prepared to adopt” (CP 5.130, 1903) supports this view. However, whether the question about the formation of subgoals belongs under ethics or esthetics, is hardly important quarrel.

homeothermic animal is just one possible way of life, to which poikilothermism is an obvious alternative.

2. *Determination of minimal system-relative normativity.* Living systems have and develop hierarchical goal, norm, need, value, interest, etc. structures, but each such a hierarchy needs some kind of minimal or ultimate interest that is somehow ‘objectively valuable in itself’ for the system. I suggest that each system have a *negative purpose to avoid extinction* as its *minimal natural self-interest*. The extinction is an absolute objective error of the system, because after extinction, all the interpretations, signs, and actions end. Avoidance of extinction is an existential precondition for every system. This minimal self-interest is embodied in the functional structures of the system. It constrains all the choices the system can do and is a mother of numerous possible subgoals, many of them mutually exclusive. There are millions of ways to avoid extinction — the whole diversity of life is a living evidence for that. (Cf. Vehkavaara 2003, 568-572.)

Conclusion

Central part of biosemiotics should be developed as *applied objective ethics* that is aided with *applied objective esthetics* rather than as *objective logic*. Objective logic with its concept of truth-seeking sign is included in objective ethics, but it forms only a special and minor part of it. Therefore, the biosemiotic applicability of the Peircean *logical* concept of triadic sign is severely restricted.

6. POSTSCRIPT — ALL THIRDS ARE NOT SIGNS

6.1. Did Peirce Support Physiosemiotics?

If our interpretation of the content of Peirce’s semeiotic cautions us about being too liberal in its biosemiotic application, we should be even more cautious, if not completely restrained, in its *physiosemiotic* (or *pansemiotic*) application. It has been suggested that Peircean semeiotic could be extended to apply to all natural processes, not only of biological nature, but of *physical* as well, so that cosmic evolution and unidirectional thermodynamic processes could be understood as *semiosis*. It cannot be denied that also Peirce seems to have at least some fantasies about a “broader conception” that he was in despair of making understood (EP 2:478, 1908). On the surface, the following quotation seems to suggest that Peirce himself supported some pansemiotic extension:

[T]he entire universe — not merely the universe of existents, but all that wider universe, embracing the universe of existents as a part, the universe which we are all accustomed to refer to as “the truth” — that all this universe is perfused with signs, if it is not composed exclusively of signs. (CP 5.448n, 1906)

The pansemiotic interpretation of this quote (e.g. by Deely 1990: 84) is nevertheless disputable. A ‘transcendental interpretation’ can be suggested too — and it seems more

plausible if contrasted to the context of the whole text. Perhaps Peirce did not refer here to natural sign-*processes*, but to 'sign-*objects*' that mediate between the reality and (human) 'transcendental subjectivity'. Still, Peirce clearly aspired to generalize the concept far beyond his original intuition of explanative representation. He gave a number of quite formal (but vague) definitions of sign as following:

A *Sign*, or *Representamen*, is a First which stands in such a genuine triadic relation to a Second, called its *Object*, as to be capable of determining a Third, called its *Interpretant*, to assume the same triadic relation to its Object in which it stand itself to the same Object. (CP 2.274, 1902)

However, Peirce's thought does not seem to be quite settled in this issue. The dates of these most formal definitions of sign seem to concentrate approximately on the years 1901-1905 (cf. Marty 1997). At the beginning of that period, Peirce started to come aware about the new philosophical sciences of phenomenology, esthetics, and ethics. Because logic could no more be taken as the most abstract of positive sciences contrary to what he had used to think, the mere *logical* concept of sign might have seemed to him inadequate and crying out for a more general definition. However, from 1904 onward (cf. CP 8.332-341), when Peirce started to approach his last and the most detailed conception of sign (the one described in Chapter 3.4), his definitions and other characterizations came less general and formal and more contentual. Many of the quotations that I have presented e.g. in Chapter 4.1 as a support to the limited interpretation of the concept of sign are quite late formulations. Moreover, Peirce himself seems to have thought that such quite formal definitions as above are too vague or involve 'a vicious circle':

[...] It is difficult to define a sign in general. It is something which is in such a relation to an object that it determines, or might determine, another sign of the same object. This is true but considered as a definition it would involve a vicious circle, since it does not say what is meant by the interpretant being a "sign" of the same object. (Peirce *MS* 939, 1905, cited from Marty 1997: §29.)

It may be that Peirce was seeking a secure physiosemiotic application of his semeiotic but failed and therefore gave up this project around the years 1905-1909. The following quote witnesses at least about his hesitation, if not more:

For forty years, that is, since the beginning of the year 1867, I have been constantly on the alert to find a genuine triadic relation [...] which is not either an intellectual relation or a relation concerned with the less comprehensible phenomena of life. I have not met with one which could not reasonably be supposed to belong to one or other of these two classes. (CP 6.322, 1909)

It can be noticed that biosemiotics is safe if not physiosemiotics.

6.2. Physiosemiotics and the Normativity of Sign

Independently on what was Peirce's last word about this issue, physiosemiotical extensions of Peircean semeiotic have been made, if not by Peirce, then by others, like John Deely (1990), Peder Voetmann Christiansen (2002), and Edwina Taborsky (2001, 2003). However, it can be doubted how far the generalization of the concept of sign can *justifiably* be drawn. Mere reference to Peirce's authority does not suffice, as we have seen. The central problem is that if the concept of sign is generalized too far, it is in danger to lose —besides its distinctive power— exactly those of its characters that are required for *logical*, or more generally, *normative* concepts. If physiosemiotics is based on such formal definitions as “a sign is something, A, which brings something, B, its interpretant sign determined or created by it, into the same sort of correspondence with something, C, its object, as that in which itself stand to C” (Peirce 1902, memoir 12), it is hard to find any normative character out of it, at least without further determinations. In its physiosemiotical application, the normative character of sign is in danger to be vitiated into mere *formative* character. Taborsky, for instance, talks about the physical universe as the evolutionary process of semiosis by means of which inaccessible energy is transformed into information or accessible energy (Taborsky 2001: 1).

A famous example of a triadic sign is $E=MC^2$, with E understood as the Object and M as the Interpretant, as measured against the referential base, the Representamen, of C^2 . [...] the sign includes the function of the Interpretant presenting itself as a truthful representation of its Object [...]

The triad, as an irreducible process, includes codal processes that act to promote symmetry or cohesion. This is the referential focus, the *representamen*. And, it has two processes that measure instances or asymmetrical actualities; there is the measurement of the input energy, known as the *object*, which then becomes measured as the output, the *interpretant*. (Taborsky 2003: 11.)

I find this kind of stretching of the concepts of object, representamen, and interpretant confusing.⁵³ Real normativity seems to be stripped off in such treatment. If the formula, $E = MC^2$, describes the form of a sign-*process* that produces mass (matter) out of unbounded or free energy, as Taborsky claims, we must ask how that process could be unsuccessful, how those ‘measurements’ (that are not made by humans) could fail. Their failure seems to mean that they were not made at all in the first place. The ‘interpretant’ seems to be a *necessary* outcome, if the ‘sign’ is to be existent at all. Within such physiosemiotical extension, some ‘sign’-processes (especially at the physical level) seem to lose their possibility to be unsuccessful and at the same time still existing. Without the *actually existing* and *erroneous* (or otherwise unsuccessful) signs, there is no real normativity. At least Peirce insisted that a sign has to have a possibility to represent its object falsely:

[...] Suffice it to say that a sign endeavours to represent, in part at least, an Object, which is therefore in a sense the cause, or determinant, of the sign even if the sign represents its object falsely. (CP 6.347, 1909)

⁵³ Although I would judge Taborsky's terminology and interpretation of Peirce skewed, the propositions that her sentences are intended to refer to are not necessarily erroneous — nevertheless, their positive content is muddy and difficult to relate.

Correspondingly, Deely has suggested that a bone of a dinosaur is a sign of that dinosaur, and the interpretant of that sign is the fossilized stone formation that used to be the bone (Deely 1990: 90). This suggestion seems to fall on the same trap as Sharov's biosemiotic application (Sharov 1998, cf. Chapters 4.1 and 4.2). From our point of view, it is easy to agree with Nöth (2001: 18) that it is hard to see how such 'triad' could be more than a concatenation of two dyads — its irreducibility does not seem to be a defensible claim.

6.3. All Thirds Are Not Signs

If the normativity of sign is given up in the generalization of the concept, it means that the general concept of sign is transformed outside of logic. To where then? I can see only two possibilities: either to *mathematics*, as in contemporary logic, or to *metaphysics*.

If a mere extracted mathematical form is taken as the abstracted concept of sign, its normative character and within that, *all* of its positive characters are lost. It steps among the numerous empty formalisms that cannot explain anything as such without the *re-application* in logic, metaphysics, or special sciences. Naturally, a purely formal theory can be useful and they are commonly applied in all species of special sciences. However, if semiotic and the concept of sign is formalized so that they lose their positive content altogether and if they are still called by their old names, the confusions easily follow. Once the concept is abstracted and formalized into a mathematical concept, it starts to stand and develop on its own base. There remains no guarantee that it is still applicable to the phenomena that it was originated from. But the joint name of the concrete real concept and the abstracted formal one suggests just that. The formalization of the concept of sign into a mathematical concept cannot be prohibited —if done properly it may even be fruitful— but to call it still a sign would be utterly misleading.⁵⁴ The confusion would be alike as in the common talk about information where statistical, physical, algorithmic, and various semantic (and semiotic) concepts are frustratingly mixed with each other.

The metaphysical transformation of the concept of sign cannot be rejected either, since it is somehow inevitable if the biosemiotic realism is our target. Nevertheless, the metaphysical application does not have to strip the concept of sign of its internal normativity. Quite contrary, as we just argued, the theory of real natural normativity, i.e. of *objective aesthetics*, can (and should) be included in it. On the other hand, the stripping off the normativity may be one legitimate way to develop a metaphysical theory. But if the concept of sign is still used in such over-generalized sense (as Deely and Taborsky seems to do), our conclusion will be alike as with its mathematical formalization.⁵⁵ Such use would be misleading and as such, it conflicts with the very purpose of pragmatism — to make our ideas and concepts clear. Peirce tried to highlight and concretize this purpose by arguing for *the ethics of terminology* that he himself found to be binding upon him:

⁵⁴ Similar argument can be applied to criticize many other trials to naturalize, operationalize, or formalize originally mentalistic concepts too. E.g. Barbieri's (2003) concept of *organic meaning* —despite that it seems to stand on its own feet— seems to be similarly 'over-generalized' and thus easily misunderstood.

⁵⁵ Though Peirce himself tended to make such over-generalization in one period, he seems to have ended up to develop the detailed description of the exclusively logical concept of sign(-process) that would lose many of its most wanted and essential characters if generalized too far.

For philosophical conceptions which vary by a hair's breadth from those for which suitable terms exist, to invent terms with a due regard for the usages of philosophical terminology and those of the English language but yet with a distinctly technical appearance. (EP 2:266, 1903.)

A 'too' generalized concept of sign would need a new name. And Peirce himself did introduce such name, the name of the third category, *thirdness*, is reserved just for that. At the beginning of his career, he thought that the category of thirdness would be covered by triadic *representations*, but later he came to think that there are also other thirds than triadic representations:

In 1867, [...] I saw that there must be a conception [of thirdness] of which I could make out some features, but being unfamiliar with it in its generality, I quite naturally mistook it for that conception of representation which I obtained by generalizing for this very purpose the idea of a sign. I did not generalize enough, a form of error into which greater minds than mine might fall. I supposed the third class of characters was quite covered by the representative characters. (CP 1.565, c. 1899)

Besides Peircean logical signs, also our more general idea about 'ethical sign', about anticipative representation, whatever its more detailed conceptual structure will be, belongs under the Peircean category of thirdness. Its leading character is *mediative* too — it mediates the transition from the current 'disturbed' or 'unsatisfying' initial state of the system into the 'hopefully satisfying' future state (cf. Chapter 5.2). But the category of thirdness, if taken as a *metaphysical* category, consists of all the real regularities of nature, of all lawful or habitual phenomena. The processes mediated by signs or representations, whether logical or 'ethical', are probably not capable of fill it up.

Thus, my final suggestion is that at least the logical concept of triadic sign should not be identified with the general concept of thirdness or its general metaphysical applications. We need several conceptions of sign or representation, probably a nested hierarchy of them. Peirce already established a part of that in his different typologies of signs, where the actions of complex signs employ simpler signs they contain (cf. EP 2:17, 1895). The main deficiency of his theory was that he considered only logical signs. If the detailed concept of 'ethical' sign can be defined and the triadic logical sign could be defined in terms of such anticipative representation,⁵⁶ much of the work that Peirce have made may be embedded in such broader conception.

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⁵⁶ One promising candidate is Mark Bickhard's concept of *interactive representation* with its ten levels (cf. Bickhard 1998), of which the fourth one might be appropriate as the basic level of 'ethical' representation. How Peircean semeiotic can be based on it and how it can be applied in biosemiotics is studied in Vehkavaara (2003: 572-583).

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